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PENICILLIN THERAPY OF SURGICAL INFECTIONS IN THE U. S. ARMY

A REPORT

MAJOR CHAMP LYONS

MEDICAL CORPS, ARMY OF THE UNITED STATES

On April 1, 1943 the Office of the Surgeon General, U. S. Army, sponsored a pilot unit for penicillin therapy at the Bushnell General Hospital at Brigham City, Utah. A second unit was established at Halloran General Hospital, Staten Island, New York, on June 3, 1943. Both of these units have functioned as "schools" in penicillin therapy, and selected medical officers have been trained for one month periods to use penicillin in accordance with an overall program seeking definition of the effectiveness of the drug in surgical infections. It is the purpose of this report to summarize the experience of these trained observers as reported from several general hospitals within the Zone of the Interior.

During this period of evaluation of a new drug it has seemed wise to concentrate experience as far as possible. Each general hospital has set aside a ward unit for penicillin therapy under direction of a trained medical officer and the chief of the surgical service. With few exceptions these wards have provided single rooms or cubicles for each patient. Surgical dressings have been done under operating room conditions. Patients and attendants have been masked, dressers have been scrubbed, gowned and gloved, and individual sterile dressing packets of instruments have been used. Every effort has been taken to prevent cross infection and secondary contamination of wounds.

The work reported herein was done under the auspices of the Office of the Surgeon General, U. S. Army, and with the cooperation of the Committee of Medical Research of the Office of Scientific Research and Development.

The clinical work has been directed by Lieut. F. W. Cooper, M. C., Ashford General Hospital; Lieut. Col. R. B. Grant Jr., M. C., Brooke General Hospital; Lieut. Col. H. G. Hollenberg, M. C., Lieut Col. F. B. Queen, M. C., Major J. E. L. Keyes, M. C., Major J. M. Walker, M. C., Capt. T. F. Barrett, M. C., Capt. A. J. Ingram, M. C., and Capt. W. J. Morginson, M. C., Bushnell General Hospital; Lieut. Col. V. S. Johnson, M. C., Major G. K. Carpenter, M. C., and Capt. K. F. Mech, M. C., Halloran General Hospital; Lieut. W. I. Glass, M. C., Kennedy General Hospital; Capt. A. L. Evans, M. C., Lawson General Hospital; Major C. V. Ervin, M. C., Letterman General Hospital; Major G. F. Wollgast, M. C., McCloskey General Hospital; Lieut. J. M. Ferrer Jr., M. C., Percy Jones General Hospital; Capt. W. H. McKean, M. C., Valley Forge General Hospital, and Capt. J. E. Hamilton, M. C., Walter Reed General Hospital.

The laboratory studies have been under the supervision of Lieut. R. Rustigian, Sn. C., and Barbara J. Silverman for bacteriology and G. Margaret Rourke, B.A., Eleanor G. Fogerty, B.A., and Jane LeFetra, B.S., for chemistry.

Col. Ralph G. DeVoe, M. C., U. S. Army, commanding officer, Halloran General Hospital, and Col. Robert M. Hardaway, M. C., U. S. Army, commanding officer, Bushnell General Hospital, gave invaluable advice and cooperation in the establishment and maintenance of the penicillin units.

Valuable assistance was given by Drs. A. N. Richards, A. Baird Hastings, A. R. Dochez, Chester Keefer and Major John D. Stewart, M. C., A. U. S.

At one of the units (Halloran General Hospital) special bacteriologic and chemical laboratory facilities have been set up. At other hospitals an especial liaison has been established with the routine laboratories to allow for preferential treatment of problems in the penicillin ward.

The program as outlined has been concerned with surgical infections and has not included the treatment of sulfonamide resistant gonorrhea. The accumulated data will be reviewed in the following order:

I. Penicillin: Methods of administration, dosage and reactions.

II. Experience in the treatment of acute pyogenic infections.

III. Experience in the treatment of chronically septic compound fractures with observations on the bacteriology of war wounds and the anemia of chronic sepsis.

I. PENICILLIN

Methods of Administration.—Both the intravenous and the intramuscular routes have been used extensively for intermittent injections. In unskilled hands the incidence of thromboses after intravenous injection is sufficiently great to make the intramuscular route preferable. The deltoid and gluteus muscles have been used most frequently. The intramuscular route has proved practical, and no contraindication to its continued use has been observed.

The constant intravenous method of treatment has been preferred for immediately life endangering infections. Penicillin has been dissolved in 5 per cent dextrose or isotonic solution of sodium chloride for constant drip administration, or injections of concentrated solutions have been made at frequent intervals directly into the tubing or into an adapter valve in the tubing.

Local application of the powdered sodium salt of penicillin is too irritating for general use.[1] Concentrations up to 5,000 units per cubic centimeter have been used occasionally, but the usual preparation has contained 250 units per cubic centimeter. The antibacterial activity of such solutions has been demonstrated in exudates for twenty-four hours after a single local application. More frequent applications may be necessary under particular circumstances, but the single daily application is usually adequate to keep the wound clean and free from pyogenic cocci. Penicillin has been injected through tubes and spigots, has been incorporated into ointments and has been applied as a wet dressing.[2] Both calcium and sodium salts have

1. Clark, A. M.; Colebrook, L.; Gibson, T., and Thompson, M. L.: Penicillin and Propamidine in Burns: Elimination of Hemolytic Streptococci and Staphylococci, Lancet **1**: 605 (May 15) 1943.

2. Florey, M. E., and Florey, H. W.: General and Local Administration of Penicillin, Lancet **1**: 387 (March 27) 1943.

been used. The nature of the wound is the chief factor in the selection of the method or vehicle for local application.

The inability of investigators [3] to demonstrate penicillin in spinal fluid after intravenous or intramuscular injection has led to a recommendation of intrathecal injection for patients with meningitis. Ventricular fluid has been shown to possess an antibacterial effect following an injection of penicillin into the lumbar space. Spurling [4] has expressed a preference for the injection of penicillin into the lateral ventricles through a burr hole as more likely to insure better diffusion of the drug from above downward than vice versa. In any event, it is important to make certain that there is no intrathecal block in a case treated through a single site of injection. Enough experience has been accumulated to state that lumbar, cisternal and ventricular routes are all practical.

Reactions to Penicillin.—Increasing experience leads to the conviction that certain untoward reactions are peculiar to particular batches of the drug and are attributable to toxic impurities rather than to the active penicillin fraction. Such impurities constitute 80 to 90 per cent of the final product and may vary from batch to batch in the hands of a single producer. It is our impression that deeply colored penicillin which foams during preparation or contains a nonfiltrable residue is most apt to give reactions. The yellow pigment is not the active agent.[5]

The reactions associated with particular batches of penicillin and thought to be due to impurities are:

1. Chills with or without fever after intravenous injection.
2. Eosinophilia of 20 to 30 per cent.
3. Burning pain at the site of intramuscular injection.
4. Headache.
5. Faintness and flushing of the face.
6. Unpleasant taste after parenteral injection.
7. Tingling in testes.
8. Muscle cramps.
9. Femoral phlebothrombosis.

Most of these reactions were encountered during the developmental period of penicillin therapy and could be prevented by Seitz filtration of the solution before injection. Such precautions are no longer generally necessary, and the various commercial products are satisfactory for use as issued. It should be noted, however, that about half the patients will experience a transient burning discomfort at the site of intramuscular injection during the first forty-eight hours of treatment but not thereafter.

There is an extremely low incidence of untoward reactions attributable to products of penicillin available at present. This product still contains many impurities in addition to penicillin, so that it cannot be concluded that even these reactions are due only to penicillin. The most that can be said are that the following reactions have not been limited to particular batches of the drug:

1. Urticaria:
   (*a*) Without fever.
   (*b*) With fever to 101 F.
   (*c*) With fever to 103 F. and abdominal cramps.
2. Fever in the first five days of therapy.
3. Transient azotemia.
4. Thrombophlebitis at the site of constant intravenous injection.

Urticaria.—The commonest single complication is probably urticaria and occurred in 12, or 5.7 per cent, of 209 cases. It has occurred during every week of treatment, as early as the first day and as late as the fourth week. It has been reported once as a complication of local therapy alone. The lesions usually develop during treatment but may occur as late as nine days after treatment has been stopped. The wheals are widely distributed over the body, the face and eyelids become swollen, and there may be swelling of the fingers with joint pains in the hands. The process continues for three to five days and is usually benefited by epinephrine or ephedrine. The course is independent of continuance or cessation of treatment. Subsequent courses of penicillin therapy in patients with a history of urticaria during the first treatment period have been uneventful and not associated with recurrent urticaria.

The complications associated with urticaria are fever and abdominal cramps. The fever is present only when the urticaria is severe and does not usually exceed 101 F. Two patients receiving large doses of penicillin (400,000 and 600,000 units daily respectively) subsequently developed urticaria, fever to 103 F. and abdominal cramps with frequent formed stools. In two other patients an unexplained fever of 103 F. without urticaria has been noted on the eighteenth and twenty-seventh days respectively. The first of these patients had no other symptoms, but the second showed dermatographia, lacrimation, conjunctival injection and sneezing. These symptoms have suggested an analogy to serum sickness, but eosinophilia has not been definite. Tests for cutaneous and ophthalmic sensitivity during and after the reactive phase have been negative. Precipitins for penicillin have been absent in the serum of patients tested during the phase of urticaria. Heterophil agglutinins have been irregularly demonstrated by means of a system adjusted for maximal sensitivity, but such agglutinins have not been significantly and constantly increased.[6] However, chemical assays of penicillin have revealed only trace amounts of nitrogen, and the active drug is not a protein.[7] For practical purposes of clinical management the urticarial reaction may be considered an atypical sensitization phenomenon. It is atypical in the sense that the period of sensitivity is remarkably transient. Therapy may usually be continued through the period of urticaria, and subsequent courses of treatment reveal no evidence of persistent sensitivity.

Fever Without Urticaria.—In a few patients fever without urticaria has been noted during the first three to five days of treatment. Such fever is most apparent in patients previously afebrile, although it may also occur and cause some concern in patients with febrile infections. In general the temperature chart reflects clinical progress less dramatically than one might expect on the basis of experience with sulfonamides. There is no evidence that penicillin is antipyretic per se.

3. Rammelkamp, C. H., and Keefer, C. S.: The Absorption, Excretion and Toxicity of Penicillin Administered by Intrathecal Injection, Am. J. M. Sc. **205**: 342 (March) 1943; The Absorption, Excretion and Distribution of Penicillin, J. Clin. Investigation **22**: 425 (May) 1943.

4. Spurling, Glenn, Lieut. Col., M. C., A. U. S.: Personal communication to the author.

5. Reid, R. D.: Some Properties of a Bacterial Inhibiting Substance Produced by a Mold, J. Bact. **29**: 215 (Feb.) 1935.

6. Serums from patients under treatment examined by Dr. W. H. Goebel, Rockefeller Institute, New York City, and Dr. C. A. Stuart, Brown University, Providence, R. I.

7. Abraham, E. P., and Chain, E.: Purification and Some Physical and Chemical Properties of Penicillin, with a Note on the Spectrographic Examination of Penicillin Preparations by E. R. Holiday, Brit. J. Exper. Path. **23**: 103 (June) 1942. Meyer, K.; Chaffee, E.; Hobby, G. L.; Dawson, M. H.; Schwenk, E., and Fleischer, G.: On Penicillin, Science **96**: 20 (July 3) 1942.

Transient Azotemia.—This has been reported during the course of treatment by the Floreys.[2] In some of their cases the blood urea nitrogen was moderately elevated during therapy but returned to normal after penicillin was stopped. Albuminuria was not noted. In the present series the nonprotein nitrogen content of the plasma has been followed. Transient elevations of 5 to 10 mg. per hundred cubic centimeters have been recorded, but the total concentration has rarely exceeded 35 mg. per hundred cubic centimeters, the highest recorded value being 48 mg. per hundred cubic centimeters.[8] Hyaline casts have been noted occasionally in the urine, but albuminuria has been absent. No clinical significance has been attached to these lesser degrees of azotemia. The observations did suggest that penicillin might have some inhibitory effect on the enzyme urease. Experimentally, penicillin failed to inhibit the urease system of Proteus mirabilis.

Thrombophlebitis.—At the site of constant intravenous injection thrombophlebitis occurs frequently. The phlebitis is noticeable during the second day of injection and may lead to chills and fever if therapy is continued through the same vein. The complication may be avoided by the use of dilute solutions of penicillin and a daily change of the position of the needle. Active phlebitis does not occur at the site of intermittent intravenous injections, and the incidence of thromboses reflects the skill with which venipuncture has been performed. As many as 500 intravenous injections have been given to 1 patient without thrombosis of a single vein.[9] The hazard of pulmonary infarction as a consequence of thrombophlebitis in the lower extremity has led to the recommendation that all intravenous injections be given in arm veins.

Dosage of Penicillin.—The greatest difficulty attends precise definition of therapeutically effective dosage for penicillin. The limited supply of the drug has encouraged determination of the minimally adequate rather than the maximally tolerated dose, and there is a definite trend to higher dosage as more liberal quantities of the drug become available. Bioassays of penicillin activity have given fairly close agreement, but it is possible to have variations of 25 per cent.[10] There is considerable variation in the stability of prepared solutions, and in certain instances it would appear that such changes were responsible for inadequate therapy. In addition, the susceptibility of bacteria to penicillin is variable not only from group to group but from strain to strain. To date it has been necessary to maintain laboratory controls of the potency of penicillin and bacterial susceptibility to insure uniformly successful results.

In general, the following suggestions in regard to dosage are valid:

Streptococcic Infections.—The group of streptococci includes resistant and susceptible species. Resistant forms have been encountered most commonly in the viridans group and the thermophilic (capable of growth at 45 C.) group of nonhemolytic streptococci (faecalis type). The susceptible species include most of the beta hemolytic, mesophilic nonhemolytic and some alpha hemolytic, or viridans, streptococci. Sensitive strains are usually extremely susceptible to penicillin. Adequate therapy for susceptible infections has been provided by 90,000 units of penicillin daily given as 15,000 units every four hours intramuscularly.

Staphylococcic Infections.—As a group the staphylococci require two to four times as much penicillin for inhibition as do susceptible strains of streptococci or pneumococci, but some strains of staphylococci are extremely sensitive. A recognized complication of therapy is the tendency of bacteria, particularly staphylococci, to become resistant, or "fast," to penicillin. Inadequate dosage tends to develop resistant strains. In our experience penicillin fastness has usually developed within the first week of treatment if it is to occur. Resistant strains have been responsible for persistence or recurrence of infection during treatment and for relapses after weeks of apparent cure. Occasional cases will progress to satisfactory healing in spite of the development of penicillin fastness by the infecting strain of staphylococcus. It has been shown that strains made resistant by in vitro passage in the laboratory develop degraded metabolic characteristics and attenuated virulence.[11] The coagulase activity and mannite fermentation of the resistant strains in this series have not been altered, and loss of virulence has not been apparent clinically. On the other hand, incomplete therapy does not lead necessarily to loss of sensitivity. A sensitive strain was recovered from a bone abscess of the femur two months after conclusion of treatment with 10,000,000 units of penicillin for a fulminating hematogenous osteomyelitis.

In summary, the hazard of penicillin fastness dictates intensive and effective initial dosage for all infections. It is particularly necessary to use large initial dosage for staphylococcic infections. For bacteremic infections the constant intravenous treatment is recommended with an initial dose of 25,000 units and 5,000 to 7,500 units every half hour thereafter for a total of 240,000 to 360,000 units daily. As much as 600,000 units daily has been required for such infections. As progress warrants, or as an alternative method for maintenance, a dosage of 25,000 units every three hours has provided 200,000 units daily. The latter dosage is routine for all nonbacteremic staphylococcic infections treated with the penicillin of present potency. It is known that this dosage will vary from one infection to another and from one particular product of penicillin to another.

Clostridial Infections.—The pathogenic clostridia have been found sensitive to penicillin,[12] but these are

8. Patient of Lieut. J. M. Ferrer Jr., M. C., Percy Jones General Hospital, Battle Creek, Mich.

9. Patient of Lieut. F. W. Cooper Jr., M. C., Ashford General Hospital, West Virginia.

10. Abraham, E. P.; Chain, E.; Fletcher, C. M.; Gardner, A. D.; Heatley, N. G.; Jennings, M. A., and Florey, H. W.: Further Observations on Penicillin, Lancet **2**: 177 (Aug. 16) 1941. Foster, J. W., and Woodruff, H. B.: Microbiological Aspects of Penicillin: I. Methods of Assay, J. Bact. **46**: 187 (Aug.) 1943.

11. McKee, C. M., and Houck, C. L.: Induced Penicillin Resistance in Pneumococcus Type III Culture, Federation Proc. **2**: 100 (March 16) 1943; Induced Resistance to Penicillin of Cultures of Staphylococci, Pneumococci, and Streptococci, Proc. Soc. Exper. Biol. & Med. **53**: 33 (May) 1943. Abraham, Chain, Fletcher, Gardner, Heatley, Jennings and Florey.[10]

12. Chain, E.; Florey, H. W.; Gardner, A. D.; Jennings, M. A.; Orr-Ewing, J., and Sanders, A. G.: Penicillin as a Chemotherapeutic Agent, Lancet **2**: 226 (Aug. 24) 1940. Dawson, M. H.; Hobby, G. L.; Meyer, K., and Chaffee, E.: Penicillin as a Chemotherapeutic Agent, J. Clin. Investigation **20**: 434 (July) 1941. Florey, H. W., and Jennings, M. A.: Some Biological Properties of Highly Purified Penicillin, Brit. J. Exper. Path. **23**: 120 (June) 1942. Gardner, A. D.: Morphological Effects of Penicillin on Bacteria, Nature, London **146**: 837 (Dec. 28) 1940. Hac, L. R., and Hubert, A. C.: Penicillin in Treatment of Experimental Clostridium Welchii Infection, Proc. Soc. Exper. Biol. & Med. **53**: 61 (May) 1943. Hobby, G. L.; Meyer, K., and Chaffee, E.: Activity of Penicillin in Vitro, ibid. **50**: 277 (June) 1942. McIntosh, J., and Selbie, F. R.: Zinc Peroxide, Proflavine and Penicillin in Experimental Cl. Welchii Infections, Lancet **2**: 750 (Dec. 26) 1942. Robinson, H. J.: Toxicity and Efficacy of Penicillin, J. Pharmacol. & Exper. Therap. **77**: 70 (Jan.) 1943.

laboratory and animal observations. Dosage for human beings is uncertain because of lack of experience with the therapy of gas gangrene. No cases of gas gangrene have been reported in this series. The proteolytic clostridia recovered from war wounds require four to five times as much penicillin as do staphylococci, whereas organisms of the tetanus-tetanomorphum group are similar to streptococci in their sensitivity. These bacteria have been responsible for anaerobic cellulitis or putrefactive locally necrotizing infections and have been isolated in frequent association with Proteus bacilli of various types. Wound infection with these organisms in abundance is indicative of devitalized tissue or bone fragments. Systemic penicillin therapy in dosages of 200,000 units daily has controlled the associated anaerobic cellulitis but has not arrested suppuration as dramatically as in the cases of pyogenic coccic infection. Local therapy is almost a necessary supplement to systemic therapy; local therapy alone has not been as effective as combined therapy. Increasing the systemic dosage up to 400,000 units daily has not seemed to be more effective. Control of the anaerobic infection usually follows wound revision and sequestrectomy. The subsidence of inflammation is entirely clinical, for the clostridia persist in the wound throughout the period of healing in spite of intensive local therapy.

The problem of penicillin fastness among clostridial species has not been investigated. It is not uncommon to isolate clostridia for the first time from a wound by culture of a sequestrum removed at operation. As such cultures are made after a period of treatment has been given it is difficult to evaluate the observed relative sensitivity of the particular strain in terms of fastness.

II. PENICILLIN THERAPY OF ACUTE INFECTIONS

The results in the treatment of acute infections are in keeping with the findings of Keefer and his associates.[13] An analysis of reported cases is presented in table 1.

Bacteremias.—Six of 9 patients with staphylococcemia recovered. All the infections were severe. The three deaths included 2 instances of endocarditis and a secondary staphylococcic infection of an extensive atypical pneumonitis. It is of interest that in both instances of endocarditis the strains recovered before treatment were subsequently shown to be resistant to penicillin. In other words, penicillin fastness was inherent and not induced in the two endocarditis strains.

The 4 patients with hemolytic streptococcus bacteremia had failed to respond to sulfadiazine. The one death occurred during the first forty-eight hours of treatment from major intracranial thromboses secondary to frontal sinusitis.

The death recorded in consequence of a bacteremia due to pneumococci and nonhemolytic streptococci represents an instance of treatment of a moribund patient with pneumonia.

TABLE 1.—*Analysis of Reported Cases*

	Number	Improved	Died	No Effect
Bacteremias				
Staphylococcus	9	6	3	0
Beta hemolytic streptococcus	4	3	1	0
Pneumococcus, nonhemolytic streptococcus	1	0	1	0
Staphylococcus, nonhemolytic streptococcus	1	1	0	0
Proteus bacillus	1	0	1	0
Meningococcus	1	1	0	0
Coli, aerogenes, nonhemolytic streptococcus	1	0	1	0
Salmonella	1	1	0	0
	19	12	7	0
Nonbacteremic staphylococcus infections				
Abscesses	12	11	0	1
Burns	2	1	1	0
Conjunctivitis	3	3	0	0
Empyema	2	2	0	0
Mastoiditis	3	1	0	2
Meningitis	2	2	0	0
Osteomyelitis	12	11	0	1
Osteomyelitis of skull	4	4	0	0
Parotitis	2	2	0	0
Skin and subcutaneous tissue	12	11	0	1
Urinary tract	4	4	0	0
Wound infections	21	17	0	4
	79	69	1	9
Nonbacteremic hemolytic streptococcus infections				
Cellulitis	5	5	0	0
Empyema	1	0	1	0
Erysipelas	1	1	0	0
Mastoiditis	2	2	0	0
Osteomyelitis	1	1	0	0
Pansinusitis	1	1	0	0
	11	10	1	0
Staphylococcic and beta hemolytic streptococcus infections				
Burns	2	1	1	0
Mastoiditis	4	4	0	0
Wound infections	2	1	0	1
	8	6	1	1
Anaerobic cellulitis				
Clostridium welchi	2	2	0	0
	2	2	0	0
Lung abscess				
Putrid	2	0	0	2
Pyogenic	2	2	0	0
	4	2	0	2
Intraperitoneal infections				
Appendical	3	1	1	1
Subphrenic abscess	2	1	0	1
Peritonitis, unknown cause	1	0	0	1
	6	2	1	3
Infections with unproved or unknown etiology				
Pyodermia	1	1	0	0
Cellulitis of leg	1	1	0	0
Pansinusitis	1	1	0	0
Osteomyelitis of tarsus	2	2	0	0
Osteomyelitis of mandible	1	1	0	0
Atypical pneumonia	1	0	1	0
Meningitis	3	2	1	0
Postoperative pneumonitis	1	1	0	0
Perinephric abscess	1	1	0	0
Scarlet fever	1	0	0	1
Arthritis, knee	1	1	0	0
Rheumatic fever	1	0	0	1
Submental abscess	1	1	0	0
Iridocyclitis	1	0	0	1
Choroiditis	1	0	0	1
Multiple sinuses	1	0	0	1
	19	12	2	5
Septic compound fractures				
Staphylococcus	30	26	0	4
Staphylococcic arthritis	2	2	0	0
Staphylococcus and beta hemolytic streptococcus	13	12	0	1
Putrid	2	2	0	0
	47	42	0	5
Miscellaneous infections				
Actinomycosis	4	4	0	0
Malaria (Plasmodium vivax)	4	0	0	4
Chronic ulcerative colitis	2	0	0	2
Coccidiosis	1	0	0	1
Pneumococcic meningitis	1	1	0	0
Pyelonephritis (nonhemolytic streptococcus)	1	1	0	0
Conjunctivitis (Koch-Weeks)	1	1	0	0
	14	7	0	7
	209	164	13	32

13. Keefer, C. S.; Blake, F. G.; Marshall, E. K., Jr.; Lockwood, J. S., and Wood, W. B., Jr.: Penicillin in the Treatment of Infections: A Report of 500 Cases, J. A. M. A. **122**: 1217 (Aug. 28) 1943.

The mixed staphylococcus and nonhemolytic streptococcus bacteremia arose from an empyema. Rib resection was performed at the time penicillin therapy was started.

The recovery recorded for meningococcemia represents a complicated case. Sulfadiazine and meningococcic antiserum were given for acute meningitis and a retrobulbar abscess. The response was slow but progressive until the tenth day, at which time serum sickness developed with an exacerbation of the infection and the appearance of multiple metastatic abscesses. The meningitis did not recur, and the patient responded to intravenous penicillin therapy without intrathecal supplement.

A recovery is listed under the heading of salmonella bacteremia. The focus of infection was a large ischiorectal and retroperitoneal abscess containing beta hemolytic streptococci in quantity. It is likely that penicillin controlled the streptococcic component of the infection, whereas the clearance of the salmonella infection was merely coincidental.

A patient with Proteus bacillus bacteremia quite understandably showed no improvement and died. Penicillin is not effective against this organism.

Another patient succumbed during penicillin therapy for a mixed bacteremia due to Escherichia coli, Aerobacter aerogenes and nonhemolytic streptococci. A septic compound fracture of the pelvis and a pelvic abscess were associated with septic thrombophlebitis of the inferior cava and its tributaries.

Staphylococcic Infections Without Bacteremia.—Sixty-nine, or 87 per cent, of 79 patients showed a favorable response to penicillin therapy. One patient with third degree burns died. The cause of death was not apparent at autopsy, but the clinical record is one of persistent hypotension following curettage of the wounds without blood transfusion. The two failures recorded under mastoiditis were instances of the development of penicillin resistance by the etiologic strains.

Osteomyelitis due to staphylococci deserves special comment. Eleven of twelve infections were reported improved as judged by sterilization of pus and complete or partial healing of sinuses. Three patients treated at Halloran General Hospital had osteomyelitis of the femur. A patient with Brodie's abscess and an abscess of the popliteal space was given systemic penicillin after a pure culture of staphylococcus was obtained at the site of spontaneous rupture of the soft parts abscess. The inflammation subsided rapidly, and on the fourth day of treatment the femur was saucerized and the wound closed around a rubber tissue drain. All subsequent cultures were sterile, the wick was removed on the fifth day and the wound healed and has remained healed for two months. A similar experience was recorded in the treatment of a cortical lesion of the shaft with subperiosteal abscess formation. A third patient was treated with penicillin through a period of acute osteomyelitis of the entire shaft of the femur. Symptomatic recovery with demineralization and new bone formation occurred. The patient was kept under observation and three months later developed an extensive medullary abscess. The entire femur was saucerized and the wound was closed without drainage. Positive cultures were obtained from the pus recovered at operation, but a sterile culture was recovered from a small amount of hematoma evacuated on the tenth postoperative day. At the present time it seems likely that the penicillin therapy of chronic staphylococcic osteomyelitis of the long bones may require surgical intervention with incomplete or primary closure of the wound. Two cases of osteomyelitis of the tarsus in which there was response to penicillin therapy without suppuration are recorded under "infections of unknown etiology." In 1 of the cases already discussed there were spontaneous subsidence and healing of a focus of osteomyelitis in the sacrum. Similar spontaneous and rapid healing of osteomyelitis of the vertebra has been observed with penicillin in cases not included in this series. There is reason to believe that penicillin may effect subsidence of osteomyelitis of flat bones without surgical intervention in the absence of sequestrums.

Hemolytic Streptococcus Infections Without Bacteremia.—Satisfactory bacteriologic sterilization was achieved in every case. One death resulted from pulmonary edema as a complication of the treatment of empyema.

Mixed Staphylococcus and Hemolytic Streptococcus Infections.—One patient with extensive third degree burns died with anuria from a cause not related to penicillin therapy. Six of 8 cases responded favorably and 1 wound infection was not influenced.

Anaerobic Cellulitis.—Two patients with low grade infections of the subcutaneous tissues due to Clostridium perfringens have responded favorably to penicillin therapy.

Lung Abscess.—Penicillin has been without effect on 2 patients with putrid lung abscess; two pyogenic streptococcus lung abscesses were healed.

Intraperitoneal Infections.—Infections arising as complications of appendicitis have not been responsive to treatment, although 1 patient showed improvement coincident with treatment. The series is too small for evaluation.

The response of patients with subphrenic abscess varies with the susceptibility of the causative bacteria.

Miscellaneous Infections.—Malaria due to Plasmodium vivax is not affected by penicillin. In addition to the 4 recorded failures, 2 other patients have developed recurrent malaria under treatment. Four patients with actinomycosis were improved by treatment, but further follow-up is necessary. Chronic ulcerative colitis failed to respond in 2 instances.

III. THERAPY OF CHRONIC INFECTION IN GUNSHOT FRACTURES

The soldier with a chronically infected gunshot fracture presents a complex clinical problem. The degree of nutritional depletion is variable and may be so extreme as to take precedence over all other factors. The bacterial infection is usually polymicrobial and may be latent or active. The anatomic abnormality is irregular, and a wide variety of surgical procedures may be adapted to the proper solution of the problem. Penicillin therapy has a definite place in the management of these cases. Our observations will be recorded in relation to the problems involved:

1. Nutritional depletion.
2. Bacteriologic characteristics of the infection.
3. Selection of cases and surgical management.
4. Results of treatment.

Nutritional Depletion.—The clinical picture of the patient with chronic infection is well known. There is weight loss, diminished strength and muscle mass, anorexia and anemia. Clinical experience with a large group of comparable cases always emphasizes similarities frequently overlooked in the course of contact with individual cases. It seems pertinent to record the observations during this period of treatment with penicillin.

The weight loss has been considerable, varying from 5 to 30 Kg. A loss of 10 Kg. is clinically obvious. Muscle atrophy and loss of strength precede weight loss, and restoration of muscle bulk and strength appear prior to significant weight gain during convalescence.

The distribution of extracellular body fluids has been examined by the sodium thiocyanate [14] and Evans blue

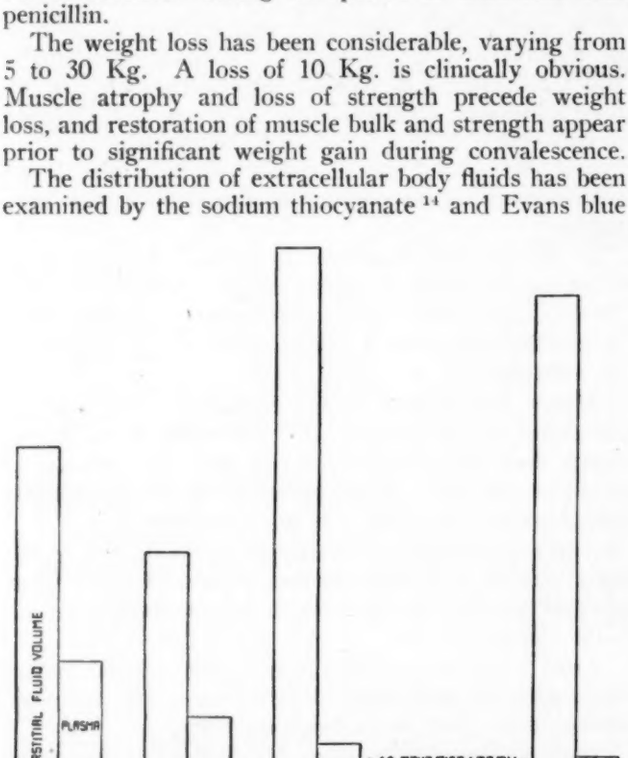

Chart 1.—The interstitial fluid volume was larger than the standard for the observed weight and for the actual weight. The blood volume was less than the standard. The deficit of hemoglobin was greater than indicated by the concentration of hemoglobin as determined in grams per hundred cubic centimeters. This patient was confined to bed with elevation of his infected leg. An abundant diet with added iron was provided. No penicillin, plasma or whole blood was given, and the patient served as a control for the effects of the usual treatment methods. After ten days of known positive nitrogen balance there was a further reduction in blood volume and total grams of hemoglobin.

	Standard		Observed	
	Average Weight	Observed Weight	On Entry	10th Day
Body weight (Kg.)	70	55.1	55.1	54.8
Interstitial fluid volume (cc.)	11,200	8,800	15,800	14,700
Blood volume (cc.)	6,300	5,000	4,400	4,100
Grams hemoglobin per 100 cc.	15	15	13.4	12
Total grams hemoglobin	945	825	545	490
Grams protein per 100 cc.	6.8	6.8	7.6	7.5
Total grams protein	240	190	200	180

dye [15] methods. These findings are presented in charts 1 to 5. On admission to the ward the patients have had an interstitial fluid volume 4 to 7 liters too great for the standard of the patient's observed weight and significantly larger than the standard for the weight prior to injury. During convalescence the interstitial fluid volume slowly decreases without apparent diuresis. The sedimentation rate has been correlated more closely with improvement than any other laboratory determination. Progressive weight gain is rarely apparent before the sixth to the eighth week of convalescence.

Significant fluctuations in the concentration of serum protein and hemoglobin have been recorded. These have been correlated with changes in blood volume and are independent of penicillin therapy. During periods of hemoconcentration the urine volume may equal or exceed the fluid intake. Unless the blood volume is known, a single observation of the concentration of the serum protein or hemoglobin may be misleading. Reductions of 1,500 to 2,000 cc. in blood volume have been recorded. This degree of reduced blood volume is dangerous if it exists at the time of operation because minor blood loss may produce an ineffective blood volume and shock.

Charts 1 to 5 demonstrate also that there is a deficit in the total quantity of circulating hemoglobin and that there is a normal or nearly normal quantity of plasma protein present. Fractionation of the serum proteins into albumin and globulin by the ammonium sulfate method in 30 cases has failed to show any significant variation from accepted normal values. The plasma fibrinogens have been constantly elevated. There have been no abnormalities of the blood electrolytes. It appears that the major deficiency in these chronically infected battle casualties is hemoglobin. This deficiency is frequently masked by hemoconcentration and normal or near normal quantities of hemoglobin in a given unit of blood. Accurate values may be obtained only by calculation of the total circulating hemoglobin when the blood volume and concentration are both known. The practical difficulties of routine blood volume determinations preclude routine use of the method. From a clinical point of view it must be assumed that every patient with chronic infection is anemic.

Liver function has not been specifically investigated. Prothrombin times have invariably been normal. With normal serum proteins and increased fibrinogen values it has been assumed that liver function is satisfactory.

Penicillin therapy does not appear to have any specific effect on the metabolic balance of nitrogen, calcium or phosphorus (table 2).

In this series of patients it has been found that the urinary nitrogen tends to be high (15 to 20 Gm. daily) without increased values for urinary potassium. Positive nitrogen balance is attained by any method that provides an intake of 130 Gm. of protein or more per day. One of the important consequences of penicillin therapy is the improved appetite. Intakes of 150 to 200 Gm. of protein are relatively easily achieved during treatment.

Observations of nitrogen balance have been made for periods of two to six weeks on 15 patients. Two standard diets have been given to provide 2,500 calories for smaller patients and 3,000 calories for larger patients. The general composition of the diet has been 60 per cent carbohydrate, 20 to 25 per cent protein and 15 to 20 per cent fat. With the exception of 2 patients with acute infections, this diet produced a positive nitrogen balance independently of penicillin

14. Crandall, L. A., and Anderson, M. X.: Estimation of the State of Hydration of the Body by the Amount of Water Available for the Solution of Sodium Thiocyanate, Am. J. Digest. Dis. & Nutrition **1**: 126 (April) 1934.

15. Gregersen, M. I.; Gibson, J. J., and Stead, E. A.: Plasma Volume Determination with Dyes: Errors in Colorimetry; the Use of the Blue Dye T-1824, Am. J. Physiol. **113**: 54 (Sept.) 1935.

therapy. On the other hand, positivity of nitrogen balance was not associated with restoration of hemoglobin values unless penicillin was given. The extraordinary virtue of penicillin in this regard is shown in charts 1 and 2. Further studies relating positive nitrogen balance to the rate of hemoglobin formation and hemopoietic activity are clearly indicated.

Patients subjected to operation without supportive intravenous supplement have been studied carefully after operation. The hematocrit, hemoglobin and plasma protein values are relatively unchanged, but the pulse rate is accelerated during the first forty-eight hours. On the third or fourth postoperative day there is a decrease in the hematocrit and hemoglobin values with an unchanged or increased plasma protein concentration. These changes are illustrated in charts 3 and 4. The blood volume is greatly reduced and there is a disproportionate reduction in the total quantity of hemoglobin as compared to the total quantity of plasma protein. It has not been possible to determine whether this is due to preferential utilization of hemoglobin, less rapid synthesis of new hemoglobin or faulty red cell regeneration. The implications for clinical therapy are clearly for whole blood instead of plasma. The quantitative aspects of replacement therapy to prevent these changes are shown in chart 5.

We have briefly reviewed the results of an extensive investigation of the nutritional status of battle casualties with chronic sepsis as they arrive in this country and after treatment with plasma and sulfonamides. The most apparently deficient substance is hemoglobin, and the interstitial fluid volume is large. Penicillin therapy does not alter nitrogen balance per se but does favor a positive balance in consequence of an improved appetite with controlled infection. Effective restoration of hemoglobin does not result from positive nitrogen balance unless penicillin is given to control infection. However, the rate of metabolic regeneration fails to keep pace with the clinical program made possible by the rapid control of the infection. Frequent transfusions of 500 to 1,000 cc. of whole blood are necessary during the preoperative and postoperative periods. A judicious combination of whole blood and plasma in 1,000 cc. quantities on the day before operation, the day of operation and the day after operation is necessary to maintain blood volume and positive nitrogen balance. Similar quantities of whole blood are necessary once or twice a week until hemoglobin values are restored and maintained at a level of 15 to 16 Gm. per hundred cubic centimeters. It should be remembered constantly that the dietary intake alone may fail to meet the reparative demands of the penicillin program.

Bacteriologic Characteristics of the Infection.—Forty-six cases of septic gunshot fracture have been the subject of extensive aerobic and anaerobic bacteriologic study. The majority of the wounds have proved to be a bacteriologic garden, but it has been possible to define four main types of infection. These are listed according to incidence:

(*a*) Putrid.
(*b*) Staphylococcus.
(*c*) Hemolytic streptococcus.
(*d*) Pseudomonas (pyocyaneus).

Putrid Wound Infection.—This produces dirty malodorous wounds. The etiologic flora is mixed and there may be some synergistic relationship on the part of the involved bacteria. Functionally the infection is proteolytic and attacks dead tissue, devitalized bone fragments, ischemic or avascular muscle and blood clot. In a sense these bacteria are wound scavengers of potential pathogenicity in wounds with extensive tissue destruction or ischemia from closure under tension. The attribute of proteolysis has clinical and bacteriologic significance. The breakdown of an organic protein matrix leads to the foul odor and the release of organically bound sulfur. Hydrogen sulfide is formed and, in the presence of iron, black iron sulfide is produced. Clinically there is frequently a distinct odor of hydrogen sulfide, and hemoglobin is blackened. In the laboratory, diagnosis depends on the digestion

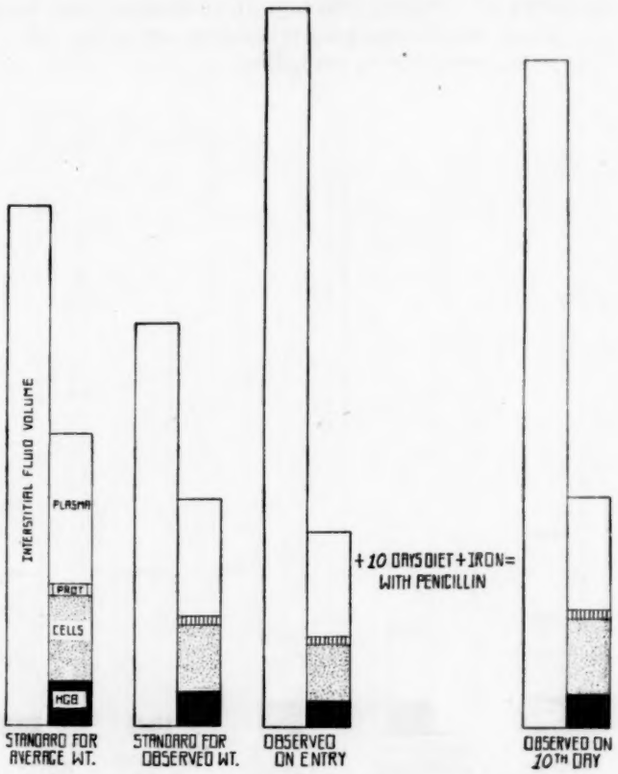

Chart 2.—This chart is to be compared with chart 1. Systemic penicillin therapy has supplemented treatment of a similar infection. An abundant diet with added iron was given, but there were no blood or plasma transfusions. The positivity of nitrogen balance was comparable to that recorded in chart 1. Attention is directed to the initially reduced blood volume and total hemoglobin with restoration of normal values during the period of treatment. The increased interstitial fluid volume was not altered significantly.

	Standard		Observed	
	Average Weight	Observed Weight	On Entry	10th Day
Body weight (Kg.)	75	58.3	58.3	58.3
Interstitial fluid volume (cc.)	12,000	9,300	16,600	15,400
Blood volume (cc.)	6,750	5,250	4,500	5,300
Grams hemoglobin per 100 cc.	15	15	13.2	14.5
Total grams hemoglobin	1,010	790	600	765
Grams protein per 100 cc.	6.8	6.8	6.7	7.5
Total grams protein	255	200	175	210

of meat particles or casein and the detection of sulfur released from sulfur containing amino acids.

The mixed flora includes proteolytic clostridia, microaerophilic and anaerobic nonhemolytic streptococci and Proteus.

The clostridia are predominantly of the sporogenes, bifermentans and tetanomorphum groups (the "fecal anaerobes" of World War I). In vitro studies have shown the sporogenes and bifermentans clostridia to be relatively resistant to penicillin, but they are inhib-

ited by four to five times the effective dose for staphylococci. The tetanomorphum clostridia are as sensitive as the hemolytic streptococci. All these organisms are difficult to remove completely from a wound. Spore forms are as sensitive as the vegetative forms of any given species.

The nonhemolytic streptococci are isolated most easily by anaerobic culture. The thermophilic and heat resistant strains of the faecalis group are generally insensitive to penicillin. The mesophilic and heat sensitive strains are as susceptible as hemolytic streptococci.

The Proteus group of bacteria has shown a preponderance of mirabilis and morganii strains. In 17 of 18 instances of Proteus infection the bacteria have been present in association with proteolytic clostridia. Proteus is not sensitive to penicillin.

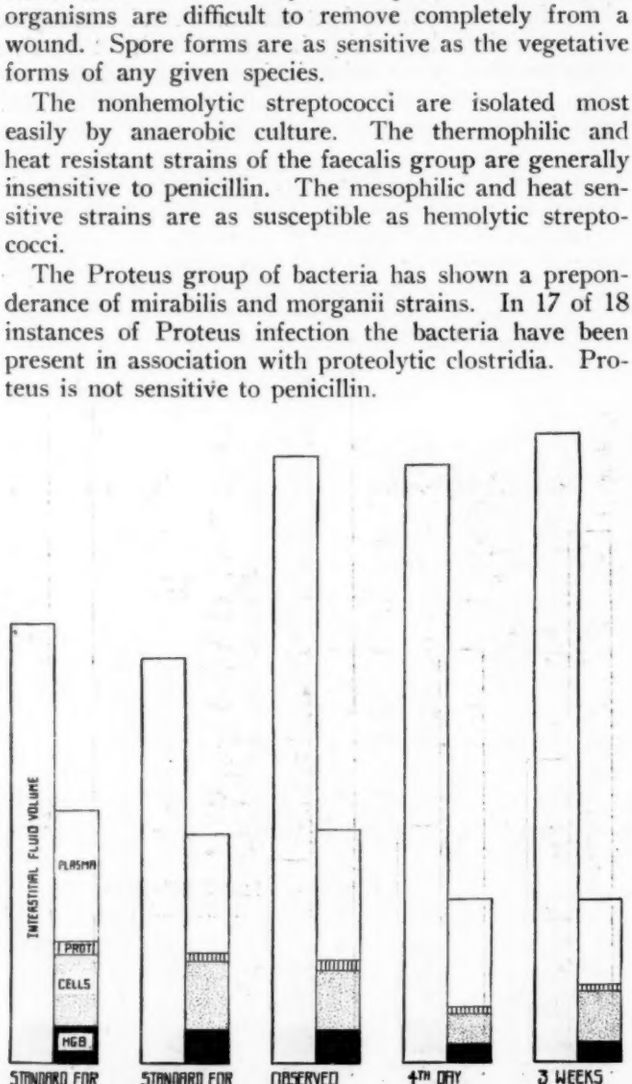

Chart 3.—This patient entered with normal blood values and an increased interstitial fluid volume. Penicillin was given to control active infection without blood or plasma. On the fourth day after operative reduction of fractured metatarsals with sequestrectomy under a tourniquet, the studies were repeated. The hemoglobin concentration fell to 12.8 Gm. per hundred cubic centimeters; the plasma protein rose to 7.4 Gm. per hundred cubic centimeters in consequence of hemoconcentration and a greater decrease in hemoglobin. It is significant that this hemoconcentration was accomplished without reduction of an excessive interstitial fluid volume. The nitrogen balance was negative throughout this period. The values recorded at three weeks after operation emphasize the slow rate of metabolic regeneration in the absence of supportive transfusions with whole blood.

	Standard		Observed		
	Average Weight	Observed Weight	On Entry	4th Day Postoperatively	3 Weeks Postoperatively
Body weight (Kg.)	64	57.6	57.6	57.9	59
Interstitial fluid volume (cc.)	10,000	9,200	13,800	13,600	14,300
Blood volume (cc.)	5,750	5,200	5,300	3,700	3,650
Grams hemoglobin per 100 cc.	15	15	14.5	12.8	13.2
Total grams hemoglobin	860	780	770	420	480
Grams protein per 100 cc.	6.8	6.8	6.9	7.4	7.4
Total grams protein	220	195	220	165	155

The presence of proteolytic putrid infection was demonstrated in 34, or 74 per cent, of 46 cases (table 3). Bacteriologic demonstration of proteolysis has been more helpful than species identification in the clinical management of putrid wound infection.

Staphylococcic Infection.—This was the second most prevalent complication. Coagulase positive staphylococci were present in 30, or 65 per cent, of 46 cases.

Beta Hemolytic Streptococcus Infection.—These were isolated from 15, or 33 per cent, of 46 patients. All except 1 of these patients had received prophylactic sulfonamide therapy. Nine received local and systemic chemotherapy, 4 only systemic, and 1 only local. The serologic groups of these strains is shown in table 4. No strain was completely resistant to penicillin therapy, but in 3 cases the strains persisted in diminished numbers in the wound until sequestrectomy was performed. There was no instance of a pure hemolytic streptococcus infection.

Pyocyaneus.—This organism was recovered in 12, or 26 per cent, of the 46 cases. Never the only etiologic organism, it frequently became predominant in the treated wounds. The abundant and intensely bluish green pus of these late wounds is almost a feature of penicillin therapy and has some diagnostic value. When the dressing is green on the surface and brown in the depths of the wound it can be assumed that anaerobic conditions were produced in consequence of improper packing. Pyocyaneus seems to thrive in the wound under treatment with penicillin. Its presence has not interfered with successful skin grafting or secondary closure of extensive defects.

The foregoing patterns of infection exist in combination (table 5). The response to penicillin therapy may be predicted fairly accurately in accordance with the susceptibility of the various infecting organisms, as shown in table 6. There has been no opportunity to conduct significant observations on the organisms of gas gangrene.

Staphylococcic and beta hemolytic streptococcus infections are controlled satisfactorily with few exceptions. When these bacteria are predominant, penicillin therapy induces a prompt subsidence of cellulitis and inflammatory edema, a diminution in the quantity of pus and a mucoid character of the exudate. This "penicillin effect" correlates with the disappearance of the bacteria on smear and culture of the pus. Cultures of sequestrums removed during treatment are often negative for streptococci but positive for staphylococci. Seventy per cent of the total of 46 wounds harbored bacteria of one or both of these susceptible species.

Pyocyaneus has a high nuisance value and may retard wound healing without causing any real concern.

The paramount problem in the penicillin therapy of septic gunshot fractures is putrid wound infection. It has been impossible to remove these organisms completely from wounds. There is a patent discrepancy between in vitro and in vivo results in many cases. A combination of systemic and local therapy will abolish fever and initiate clinical improvement in patients with pure putrid infections. In such instances suppuration continues until sequestrectomy is performed. The association of putrid wound infection with retained fragments of devitalized bone or foreign bodies is constant. After surgical trauma the infecton flares up temporarily as the bacteria gain a foothold in the damaged tissue and blood clot of the wound. Attempts at partial or complete wound closure invite anaerobic cellulitis. Operative sequestrectomy should be per-

formed with minimal trauma, and no exposed cortical bone should be left in the wound. Local therapy should be continued until the wound is healed to prevent secondary staphylococcic infection. The pus of such secondary infection provides an acceptable medium for the growth of proteolytic bacteria. Penicillin therapy must be supplemented with meticulous local care of the wound when putrid infection is present.

Gram Negative Bacilli.—Gram negative bacilli of the colon, paracolon, Aerobacter and para-Aerobacter groups have been inconstant and transient contaminants of the wound. They rarely persist for more than a week in a properly managed wound. The air of the dressing room has been found to be a source of such contamination. These bacteria have been below the level of clinical significance.

Selection of Cases and Surgical Management.—It is necessary to have a definite program for the primary selection and subsequent management of all surgical patients. The presence of infection presents no diagnostic problem, but it has been recognized that infection may be latent or active. Activity of infection has been evaluated in terms of fever, cellulitis or gross suppuration.

The presence of sequestrums or retained foreign bodies is almost universal in these patients. Metallic missile fragments are not a frequent source of chronic suppuration. Bits of clothing, particles of concrete from land mines and other débris have been a fairly constant source of suppuration persistent during treatment. Sequestrums have been sterilized of streptococci but continued to harbor staphylococci, clostridia, Proteus and Pyocyaneus in spite of local therapy. Sequestrectomy and the removal of foreign bodies are an essential part of an effective penicillin program.

Septic arthritis, uncomplicated by foreign bodies in the joint, responds dramatically. Local therapy is an effective supplement in the management of this complication. In some instances the plan of repeated aspiration and injection of penicillin has been followed. In other cases it seemed preferable to establish surgical drainage without actually placing drains in the joint cavity. Sequestrums or foreign bodies in the joint have required removal.

These observations have established operative procedures as part of the program and made it necessary to define a schedule of penicillin therapy in relation to operative intervention. The patients have been divided into four groups:

Group 1. Latent infection and no nutritional depletion.
Group 2. Latent infection with nutritional depletion.
Group 3. Active infection with no nutritional depletion.
Group 4. Active infection with nutritional depletion.

Nutritional depletion is estimated in terms of weight loss, general appearance of the patient and anemia.

Patients in group 1 with latent infection and no nutritional depletion receive no preliminary therapy. Penicillin is reserved for those cases which present postoperative exacerbations of infection. In a few patients with staphylococcic or mixed staphylococcic and hemolytic strepticoccus infection, penicillin has been tried as a prophylactic measure to permit bone graftings or platings with primary closure. These cases have been carefully selected, and the results warrant a cautious expansion of such practice.

Patients in group 2 with latent infection and nutritional depletion profit by a period of supervised diet and repeated blood transfusions. The decision to use or withhold penicillin has been variable in accordance with clinical opinion and the predominant bacterial pathogen in the wound.

Patients in group 3 with active infection and no nutritional depletion usually represent instances of acute infection. As such, they are candidates for immediate therapy.

Patients in group 4 with active infection and severe nutritional depletion comprise the majority of patients under treatment. By and large, replacement therapy with diet, iron and whole blood is more effective when penicillin is used to control the infection. The timing of operation depends on the efficacy of the supportive program. Three to five days of penicillin and transfusion therapy is often sufficient to prepare the patient for the indicated operation. For a few patients a week to ten days of preparation has seemed valuable.

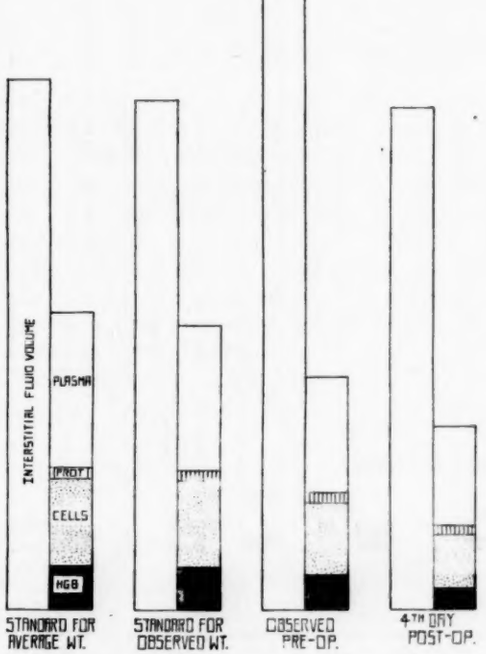

Chart 4.—This chart is to be compared with chart 3. The patient received penicillin without supportive transfusions. A compound fracture was reduced and plated. The initial concentration of hemoglobin was nearly normal; the blood volume was reduced. After operation there was a further diminution in blood volume with a definite decrease in hemoglobin. The significant feature of the study was the observation that a loss of 4,300 cc. from the interstitial fluid volume was recorded coincidentally. It is argued that an available interstitial fluid may buffer the reduction of blood volume without preventing critical deficit in the hemoglobin fraction.

	Standard		Observed	
	Average Weight	Observed Weight	On Entry	4th Day Post-operatively
Body weight (Kg.)	77	72.8	72.8	71.7
Interstitial fluid volume (cc.)	12,300	11,700	15,900	11,600
Blood volume (cc.)	6,900	6,600	5,400	4,250
Grams hemoglobin per 100 cc.	15	15	14.5	11.7
Total grams hemoglobin	1,035	990	810	500
Grams protein per 100 cc.	6.8	6.8	8.0	7.5
Total grams protein	260	245	232	190

Postoperatively it is important to maintain nitrogen balance. This can be done by supplying 130 Gm. of protein daily. In most cases intravenous therapy is

necessary to maintain this intake on the day of operation and the first postoperative day. Plasma supplies 7 Gm. of protein per hundred cubic centimeters, whereas whole blood supplies more nearly 18 Gm. per hundred cubic centimeters. It can be seen that this protein requirement is met by 2 liters of plasma, 750 cc. of whole blood or a mixture of 500 cc. of whole blood and 500 cc. of plasma. The greater need for hemoglobin has been emphasized, and there is an increasing preference for whole blood. Transfusion therapy is continued during the phase of convalescence to maintain blood volume, hemoglobin and red cell values.

Patients with closed wounds and an uneventful convalescence have received penicillin systemically for eight to ten days. The management of the open wound has been variable. Removal of the pack in the first five days leads to wound hemorrhage, putrid wound infection of the blood clot and contamination with air

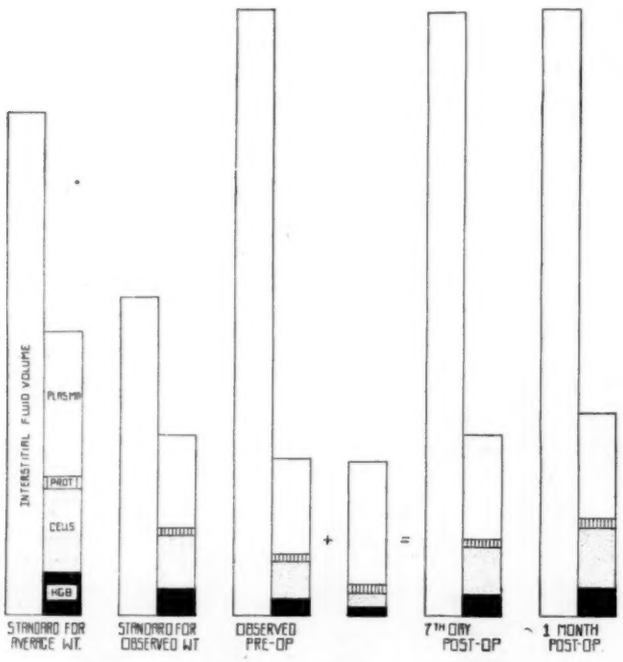

Chart 5.—This chart should be compared with charts 3 and 4. It is designed to show the measure of benefit from 1,500 cc. of whole blood and 2,500 cc. of plasma, a total of 4,000 cc. given over a three day period in relation to sequestrectomy. The blood volume was increased to a standard normal value, but 1,500 cc. of whole blood did not raise the total hemoglobin value to a normal level. The total deficit would have been met more effectively by the use of a total of 2,500 cc. of whole blood than by the mixture of blood and plasma. The interstitial fluid volume remained unchanged throughout this period. The increase in blood volume one month after operation is due entirely to an increase in cells with an unchanged plasma volume; the hematocrit has returned to normal.

	Standard		Observed			
	Average Weight	Observed Weight	On Entry	Given as Transfusions	7th Day Postoperatively	1 Month Postoperatively
Body weight (Kg.).....	82	52.1	52.1	4,000 cc.	52	
Interstitial fluid volume (cc.).....	13,100	8,300	15,800	.....	15,700	15,800
Blood volume (cc.)....	7,400	4,700	4,100	.....	4,700	5,300
Grams hemoglobin per 100 cc.....	15	15	11	.....	12.2	13.8
Total grams hemoglobin.....	1,100	705	450	225	575	730
Grams protein per 100 cc.....	6.8	6.8	7.2	.....	6.6	7.22
Total grams protein...	280	175	195	220	190	215

borne gram negative bacilli. Immediate irrigation of the operative wound with penicillin introduced through inlying tubes may prolong the period of postoperative bleeding. At the present time systemic penicillin therapy is continued for five to seven days. The wound is then dressed and gently cleansed with hydrogen peroxide to remove blood clot and devitalized tissue fragments. Gauze is saturated with salt solution containing 250 units of penicillin per cubic centimeter and gently placed in the wound under a seal of gauze impregnated with ointment. Systemic penicillin is usually discontinued at this time if subsequent daily dressings are feasible. Some form of therapy must be continued until all bare bone is covered with healthy granulation tissue. Local therapy is preferable whenever practical because it is more economical than systemic therapy. A high local concentration is particularly useful to reduce the intensity of infection with proteolytic clostridia.

Results of Treatment.—Table 7 records the results of penicillin therapy in 45 cases of septic compound fractures. Forty, or 88 per cent, showed improvement in consequence of treatment. Sequestrectomy was performed in 34 of the 40 "improved" cases, whereas no operation was performed in the 5 failures (table 8). One of the 5 failures ultimately came to amputation of the foot for extensive osteomyelitis of the entire tarsus. Complete wound healing is known to have occurred in 25 of the 40 successful cases, and the wound was clean and granulating at the time of the report in 13 others. Of the 6 cases in which improvement occurred without sequestrectomy, recurrent infection in a previously healed wound subsequently developed in 2.

A review of the data sheets reveals the fact that the scarcity of penicillin has led to its use for only the more seriously infected patients with extensive anatomic defects. The period between penicillin therapy of the infection and complete wound healing may be considerable. The results as given for the 45 patients followed through to wound healing are substantiated by the clinical progress of 20 other patients incompletely healed at the present time. It is significant that no death has resulted from this early correction of the infected fractures. The importance of the studies to date lies in the demonstration that penicillin permits active surgical intervention almost immediately. Many of the patients reported as healed will require reconstructive operations. It is premature to draw any conclusions as to the role of penicillin in such a program. The incidence of late recurrence of infection cannot be predicted. The need for continued observation of these patients is recognized.

SUMMARY

For the routine systemic administration of penicillin there is a preference for the intramuscular route. Intravenous therapy is used for the constant administration of the drug in cases of immediately life endangering infections. In the treatment of meningitis, penicillin has been injected into the lumbar space, the cistern and the ventricles. Systemic therapy has been used initially. Local therapy has been supplemental and effective in those wounds appropriate for topical therapy. In many cases a short period of systemic therapy has been followed by local treatment of an operative wound.

It is premature to attempt a precise definition of dosage. The quality and potency of penicillin are still showing rapid improvement. A safe average dose for streptococcic and similarly sensitive bacterial infec-

tions is about 90,000 units per day given in divided doses intramuscularly every four hours. Staphylococcic infections require 200,000 to 400,000 units daily given in divided doses every three hours intramuscularly. Solutions for local therapy containing 250 units per cubic centimeter have been satisfactory.

The untoward reactions attributable to penicillin are analogous to the syndrome of serum sickness. Urticarial reactions have been noted in approximately 5 per cent of the cases and have occurred as a complication of local therapy without parenteral penicillin. The urticaria may appear after the first dose or as long as nine days after the last dose. It appears equally frequently in the various weeks of treatment. Fever and, more rarely, abdominal cramps may appear with urticaria. Fever with dermatographia and no urticaria has been seen. These reactions suggest a form of sensitization, but tests for sensitivity are negative. Treatment can be continued usually through the three to five day period of urticaria with subsidence of the reaction. There is no evidence of permanent sensitization to penicillin.

TABLE 2.—*Metabolic Balance as Affected by Penicillin Therapy in a Convalescent Patient*

	Period 1—6 Days No Penicillin	Period 2—6 Days With Penicillin
Intake in grams		
Calcium	0.88	0.88
Phosphorus	5.33	5.33
Nitrogen	70.2	70.2
Urine output in grams		
Calcium	2.29	2.40
Phosphorus	4.85	4.82
Nitrogen	63.6	61.9
Urine volume in cc	11,518	11,145
Stool output in grams		
Calcium	1.42	1.28
Phosphorus	2.14	1.73
Nitrogen	12.7	11.5
Total output in grams		
Calcium	3.71	3.68
Phosphorus	6.99	6.55
Nitrogen	76.3	73.4
Metabolic balance		
Calcium	−2.83	−2.80
Phosphorus	−1.66	−1.22
Nitrogen	−6.1	−3.2

The results in the treatment of acute infections due to staphylococci and the sulfonamide resistant streptococci are additional proof that penicillin is an exceptionally potent antibacterial agent. The inability of the drug to control staphylococcic endocarditis has been confirmed. Evidence is accumulating that surgical intervention is often necessary in the penicillin therapy of staphylococcic osteomyelitis of the long bones, whereas a more conservative program is warranted in infections of the flat bones. Temporary improvement has been recorded during brief periods of treatment in actinomycotic infections. In general, the response to therapy is conditioned by the susceptibility of the infecting organism and the pathologic anatomy of the inflammatory process.

Particular emphasis has been given in this report to the usefulness of penicillin in the immediate management of septic gunshot fractures. When susceptible bacteria predominate in a wound there is prompt improvement during treatment with recurrence later. This recurrence is due to sequestrums or foreign bodies and the inability of penicillin to sterilize such foci of infection. Surgical intervention is necessary in most instances. Operations on patients with chronic infections are notorious for their incidence of shock, anoxic complications and prolonged convalescence. It is not surprising that this investigative program has been concerned with intensive operative preparation and postoperative care.

TABLE 3.—*Analysis of Bacterial Flora in 34 Cases of Putrid Infection in Septic Gunshot Fractures*

1. Proteolytic clostridia	32
2. Proteus bacilli	18*
3. Nonhemolytic streptococci	19
a. Mesophilic	6
b. Thermophilic	9
c. Mixed	4

* Proteus bacilli were present with clostridia in 17 cases.

TABLE 4.—*Serologic Grouping of Beta Hemolytic Streptococci*

Group A	6	Not group A, B, C	4
Group B	0	Not tested	4
Group C	1		—
Total			15

The "unsteady state" of these patients has been related to a reduced blood volume, a deficiency of the total circulating and available hemoglobin and an excessive interstitial fluid volume.

The blood volume is always small in relation to the standard, but considerable fluctuation in the actual size of the blood volume occurs without apparent cause. Such a finding is not surprising in view of the increased interstitial fluid volume. During these phases of hemoconcentration and hemodilution there is considerable variation in the concentration of red cells, hematocrit, hemoglobin and serum protein. The usual laboratory findings show wide discrepancies from day to day unless

TABLE 5.—*Bacteriology of Septic Gunshot Fractures*

Type of Infection	Number of Cases
Putrid only	4
+ Staphylococcus	9
+ Staphylococcus and hemolytic streptococcus	5
+ Pyocyaneus	5
+ Staphylococcus, hemolytic streptococcus and pyocyaneus	5
+ Staphylococcus and pyocyaneus	4
+ Hemolytic streptococcus	2
+ Hemolytic streptococcus and pyocyaneus	0
Staphylococcus only	4
+ Hemolytic streptococcus	1
+ Pyocyaneus	1
+ Hemolytic streptococcus and pyocyaneus	1
Hemolytic streptococcus only	0
+ Pyocyaneus	1
Pyocyaneus only	0
Total	46
Putrid infections	34, or 74%
Staphylococcic infections	30, or 65%
Hemolytic streptococcus infections	15, or 33%
Pyocyaneus infections	12, or 26%

they are interpreted in terms of total circulating quantities on the basis of a known blood volume.

A positive nitrogen balance may be established by an adequate diet alone, but restoration of hemoglobin values demands effective control of the infection. Penicillin therapy is associated with an improved appetite and effective repair of hemoglobin deficits. The rate of metabolic regeneration is too slow to keep pace with the needs of an operative program, however, and economy of penicillin and hospitalization requires a supplemental source of hemoglobin. Whole blood meets this demand more effectively than plasma. The quantity is formidable. It is estimated that 1,500 to 3,000 cc. of blood per patient is necessary.

TABLE 6.—*Response to Penicillin*

Type of Infection	Penicillin Response: Systemic	Penicillin Response: Local
I. Putrid		
1. Proteolytic clostridia	+ (large dosage)	+
2. Proteus bacilli	0	0
3. Nonhemolytic streptococcus		
a. Mesophilic	+	+
b. Thermophilic (Strep. faecalis)	0	0 (or slight)
II. Staphylococcus	+ (3-5 days)	+ (often necessary)
III. Hemolytic streptococcus	+ (1-3 days)	+ (not essential)
IV. Pseudomonas (pyocyaneus)	0	0

The bacteria present in the wounds are variously susceptible to penicillin and are important limiting factors in the choice of operative procedure in a given case. The staphylococci and hemolytic streptococci can be controlled effectively in the great majority of instances. Pyocyaneus is not inhibited and has a high nuisance value but rarely does more than delay wound healing. The proteolytic bacteria of putrid wound infection are present in three fourths of the cases.

TABLE 7.—*Results of Treatment of Septic Compound Fractures* *

Site	No. of Cases	Improved	Died	No Effect
Femur	17	13	0	4
Lower leg	12	12	0	0
Foot and ankle	8	7	0	1
Upper extremity	7	7	0	0
Skull	1	1	0	0
	45	40	0	5

* This series is composed of cases followed for a sufficient period of time to allow evaluation and should be distinguished from the group of 46 cases reported in the bacteriologic analysis.

Anaerobic cellulitis is favorably influenced by penicillin given systemically in large doses. High concentrations of locally applied drug are necessary for the maximal inhibition of the proteolytic clostridia and the nonhemolytic streptococci. Proteus and the faecalis groups of streptococci are insensitive to penicillin. Putrid wound infection is a contraindication to extensive surgical revision or primary wound closure even when penicillin is given.

The results in the treatment of septic gunshot fractures indicate that dramatically successful results may be achieved by the meticulous surgeon who combines penicillin, effective blood transfusions and conservative surgical procedures into a program of thoughtful management of individual cases.

CONCLUSIONS

1. Penicillin has been administered intravenously, intramuscularly, intrathecally and locally. The indications for each of these routes have been established.

2. The untoward complications noted in this series have been limited to urticaria and other reactions suggesting an analogy to serum sickness. The reactions are transient during therapy and there is no permanent sensitization. No significantly harmful effects have been observed.

3. Penicillin is an effective antibacterial agent in the treatment of acute infections caused by staphylococci, hemolytic and nonhemolytic streptococci, mixed infections due to gram positive bacteria and actinomycosis. The gram negative diplococci are susceptible to treatment. Gram negative bacilli are resistant. Mixed infections with both gram positive and gram negative bacteria may be benefited through the effect on the susceptible bacterial species. Malaria has not been controlled by penicillin.

4. An intensive investigation of the clinical status of patients with chronically infected gunshot fractures has revealed a major deficiency of red blood cells and hemoglobin. Positive nitrogen balance may be established in the presence of continuing infection, but the synthesis of new tissue proteins and the regeneration of red cells and hemoglobin are dependent on control of the infection. The dramatic effectiveness of penicillin in rapidly establishing this phase of convalescence is added proof of the unique position of the drug among antibacterial agents. The normal rate of hemoglobin regeneration is not surpassed, and whole blood transfusion therapy is necessary.

TABLE 8.—*Relation of Sequestrectomy to Result of Penicillin Therapy*

	Number of Cases	Sequestrectomy
Improved	40	34
No effect	5	0

5. The polymicrobial character of septic gunshot fractures has been defined in terms of putrid wound infection, staphylococcic infection, hemolytic streptococcus infection and Pyocyaneus infection. Staphylococci and streptococci are rapidly responsive to therapy. Anaerobic cellulitis due to the proteolytic bacteria of putrid wound infection responds to penicillin, but the bacteria may persist in the presence of devitalized tissue or wound exudates. Pyocyaneus is not susceptible to penicillin and is relatively unimportant as a single pathogen in the surgical management of the wound.

6. Penicillin therapy permits a direct and immediate surgical approach to the management of septic gunshot fractures. Its role in this regard is analogous to the use of vitamin K for patients with obstructive jaundice. Such a concept emphasizes the limitations of penicillin therapy and designates the supplemental position of penicillin in the overall surgical program.

TRIBAL EPIDEMICS IN THE YUKON

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Native peoples in isolated parts of the world frequently experience fulminating epidemics following exposure to inhabitants of populated regions. The American Indians have recently experienced such epidemics along the course of the new Alaska Military Highway over previously remote regions of Alaska and Canada. Among these may be cited the diphtheria epidemic among the Indians on the Ross River during August 1943 and a pneumonia epidemic which has resulted in the death of 50 of the 200 or more inhabitants of Telegraph Creek, British Columbia, between October 1942 and September 1943. The sequence of epidemics at the Indian settlement on Teslin Lake, in the Yukon Territory, reflects certain endemic diseases of populous areas which may constitute a hazard to remote communities.

The Indian village at the junction of Nisutlin Bay with Teslin Lake contains about 130 individuals who have had little exposure to outside civilization since the great gold rush of 1896. The tribe, which speaks the language of the Thlingit Indians of Alaska,[1] once descended the Takou River each spring to peddle furs at Juneau. From the time of the Klondike gold rush the people settled at a trading post established midway along the 110 mile expanse of Teslin Lake. Living along the trap lines in winter and returning to the lake village each summer for hunting and fishing, they have had little intercourse with the white man for almost half a century except through a few traders, mounted police and missionaries.

Work on the Alaska Highway in the spring of 1942 brought a change in the Indian way of life. The men worked on construction projects instead of going on the hunt, and the settlement was visited by numerous soldiers and workmen recently arrived from metropolitan areas. For the first time the tribe wintered in the village instead of going out along the trap lines. During the long preceding interval of isolation there had been little infectious disease except for occasional upper respiratory ailments in the spring trading season and one relatively severe epidemic of respiratory disease in 1936 supposedly introduced by placer gold miners. Acute illness was regularly absent during the months spent in the bush.

The first outbreak of serious infectious disease began in 1942, on September 20 of the summer during which construction work was begun. Within a month, in spite of strict quarantine measures, measles had spread to 121 natives and 8 half breeds in a population of 135 and had resulted in three deaths from a complicating bronchopneumonia. Of the 6 natives spared by the epidemic, 5 were more than 70 years of age and 1 a girl of 18 thought to have had the disease while away at school. Shortly after the appearance of measles more than half the tribe also came down with diarrhea. This was identified as dysentery. The patients were observed and treated by army officers from a nearby dispensary.

In the year which followed, a succession of other infectious diseases invaded the village. Cases of jaundice began to appear in January 1943, the symptoms usually consisting of visible jaundice accompanied by malaise, anorexia and vomiting. This disease, which appears to have been catarrhal jaundice, affected only a few at a time but had reached nearly all the inhabitants within a period of four months. In April 1943 whooping cough appeared. This too spread to nearly every one but did not result in any fatalities. In June 1943 German measles reached nearly all. There were also sporadic cases of mumps, tonsillitis and middle ear disease complicating upper respiratory ailments. Tuberculosis was diagnosed in 3 cases, but this disease has been endemic among the local tribes for a long time.

The largest number of fatalities accompanied the meningococcic meningitis epidemic which began in the summer of 1943. On the morning of June 28 a 17 year old Indian youth died suddenly after an illness of twenty-four hours. The symptoms included drowsiness, headache, stiff neck, fever, vomiting, abdominal cramps and finally a shower of purpuric spots on the skin. On the following day 3 other Indians had developed similar symptoms. They were transported 100 miles by hydroplane to the Whitehorse General Hospital, where a diagnosis of meningococcic meningitis was made from spinal fluid studies by Dr. F. B. Roth. Two of these patients died soon after arriving at the hospital. One was a 22 year old brother of the first victim, the other a girl of 4 from the family next door. The third, a youth of 18, responded to therapy and recovered.

In the week which followed 6 more children from 2 to 18 years of age developed a sudden febrile illness with a similar onset consisting of irritability, restlessness, drowsiness, headache and varying degrees of stiff neck. Five were treated on the day of onset of symptoms and responded promptly to sulfadiazine therapy. In the youngest, aged 2, the disease was not recognized or treated until the third day after the onset of symptoms. This infant, a brother of the 4 year old girl who died, received four days of intensive therapy with sulfadiazine and intravenous and intrathecal antimeningococcus serum before the spinal fluid became clear and there was evidence of recovery. On July 16 the 6 year old son of the chief of the tribe developed the same sequence of symptoms and died within ten hours. He was examined at the time of death, and purulent spinal fluid was obtained which contained gram-negative diplococci. A small brother and sister and a cousin next door developed headache and fever but recovered after a few days of treatment with sulfadiazine. Altogether 14 children became ill and 4 died, but no known cases of meningitis occurred among children or adults outside the tribe.

COMMENT

The popular impression that these epidemics were a menace to the neighboring population resulted in the imposition of strict quarantine measures intended to prevent the contagion from spreading from the village to nearby troops and workmen. It is apparent, however, that these recent epidemics among the Teslin

From the P. R. A. Rancheria River Hospital on the Alaska Highway. This work was done under the auspices of the University Committee on Pharmacotherapy.

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1. Jenness, Diamond A.: The Indians of Canada, National Museum of Canada, Ottawa, 1934.

Indians can be attributed neither to insanitary living habits, since such habits have changed little from time immemorial, nor to some supposed lack of resistance to disease in general on the part of the Indian. In the meningitis epidemic described, treated patients recovered and the course of both treated and untreated patients was not unlike that observed in white communities. No cases occurred in the neighborhood except among the Indians, and the actual effect of the quarantine was the reverse of that intended; it served only to protect the village from further exposure to carriers among the white men.

Risk to the white population from these tribal epidemics was negligible because exposure was already universal and any one not immune would have contracted the disease previously. The danger of spread to the white population was therefore largely imaginary, but a real psychologic hazard which could readily have precipitated a panic.

It is well known that the common childhood diseases which attacked the Teslin Indian village are endemic in any large white population. The source of the meningococcic meningitis epidemic cited is even more clearly apparent from the fact that the tribe was surrounded by men recently arrived from urban communities where 30 per cent or more of the population carry meningococci in the nose and throat during the summer months. Meningitis occurring under such conditions of universal exposure must therefore be limited to susceptible individuals not previously exposed. This accounts for the appearance of the disease in epidemic form in a remote Indian village and its more sporadic occurrence in metropolitan areas where such infectious diseases are most frequent among small children and persons recently arrived from isolated regions.

SUMMARY

Infectious diseases endemic in urban communities have appeared along the Alaska Military highway as sudden epidemics among the American Indians. In 1942 and 1943 the native settlement on Teslin Lake was attacked successfully by measles, dysentery, catarrhal jaundice, whooping cough, German measles, mumps, tonsillitis and meningococcic meningitis. There were three fatalities from measles and four from meningitis. The proper medical management of such tribal epidemics requires recognition that the risk of infection is a serious hazard to the native population but not to previously exposed individuals recently arrived from populous areas.

The Thyroid Gland.—It was just a little over one hundred years ago (1836) that T. W. King at Guy's Hospital in London saw and described for the first time the elementary units of which the thyroid gland is composed—the follicles with a translucent material called colloid. As the result of a long series of clinical and experimental studies, we now know that this gland secretes and supplies the body with a hormone which is of vital importance to body economy. This hormone was isolated and identified as an iodine-containing compound in 1915 by the American chemist E. C. Kendall, who called it thyroxine. It was subsequently (1927) synthesized by the London chemists C. R. Harington and G. Barger. Our knowledge of the physiology and chemistry of the thyroid is intimately bound up with the story of the surgeon's efforts to remove safely enlargements of the thyroid—so-called goiters.—Haagensen, C. D., and Lloyd, Wyndham E. B.: A Hundred Years of Medicine, New York, Sheridan House, Inc., 1943.

THE TRANSFUSION OF BLOOD AND BLOOD DERIVATIVES UNDER EMERGENCY CONDITIONS

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The problems which arise in connection with the transfusion of war casualties differ to some extent from the problems of peacetime injuries. In the first place the war casualties transfused are usually healthy persons who have suddenly had a knockout blow, while the peacetime patients are sick people with a weak, if not grossly disordered, cardiovascular mechanism. Secondly the majority of wartime transfusions are given under adverse circumstances. Only too often the bombs responsible for the casualties destroy the lighting system and the heating and the water supplies. The transfusion team, if the incident occurs at night, may be entirely dependent, for instance, on its own light supply. If all the windows in the building have been broken, even electric torches are likely to cause a good deal of concern to air raid wardens in charge of the blackout. Work has to be carried out with a forehead lamp only, the battery being carried in the pocket. Further, the number of patients requiring immediate attention often exceeds the accommodation, and the staff is overwhelmed. Such conditions make both laboratory and clinical investigations extremely difficult. The sick patient or the single street accident in peacetime can on the other hand be treated under optimum conditions as regards both general and laboratory facilities.

My object in the present paper is to discuss the principles that have been tentatively formulated as the result of recent experience for the treatment of casualties under the type of emergency conditions outlined.

TRANSFUSION TEAMS

It has proved both impracticable and unwise to supply every hospital with sufficient transfusion fluids and equipment to enable it to meet any wartime emergency, however severe. In the first place the quantities required for the whole country would reach astronomical figures and secondly if the hospital itself is hit, as has not infrequently occurred, the stocks are destroyed. In practice hospitals have been given enough derivatives and equipment to meet the needs of the first few hours and instructed to telephone immediately to a blood depot for further supplies as soon as the incident occurs. The depot then at once dispatches equipment, blood, derivatives and often personnel trained in transfusion technic. It has been found that this system causes no delay in instituting treatment, since casualties are not usually rescued from ruined buildings for some hours and the transfusion teams reach the hospital in many cases before the patients. In the case of the smaller country hospitals this provision of skilled personnel has proved of considerable value. It is essential that nurses as well as doctors should understand the principles of treating patients suffering from shock. They must be able to record blood pressure readings and manipulate the administering apparatus, since the maintenance of treatment must be left in their hands when large numbers of casualties occur. The importance of adequate maintenance treatment cannot be overstressed. Unless the

From the Northwest London Blood Supply Depot.

patient is constantly watched and the rate and quantity of the transfusion controlled, the best results are not obtained. One trained person can at most look after two casualties after the transfusion has once been started and it is preferable to allocate one nurse to each casualty.

TYPE OF CASE IN WHICH TRANSFUSION IS REQUIRED

In the early weeks of the blitz on London, casualties were considered to require immediate transfusion only if they showed signs of circulatory collapse as evidenced by a blood pressure below 100 mm. of mercury, a cold and clammy skin, pallor or cyanosis, restlessness and a rapid thready pulse. If the blood pressure was above this level and the associated signs and symptoms were not present, however severe the injury, the patient was sent to the operating theater without transfusion. It was then noted that many of these patients who had no obvious "shock" on admission showed a rapid deterioration either in the theater or on return to the ward and subsequently died. Others who, owing to their apparently poor condition on admission, were retained for resuscitation and were given transfusions before operation did well.[1] Careful analysis of the available observations made it clear that certain individuals, especially the younger people, may even show a compensatory rise in blood pressure as a result of severe injury.[1] Further trauma, however, as for instance débridement in the operating theater, results in a sudden collapse of such patients which even prompt transfusion may then be unable to counteract. It is now widely held that any severely injured patient should be transfused, irrespective of the clinical condition and the level of the blood pressure, before being sent to the operating theater: in fact, transfusion should be begun as soon as possible after the injury. The victims of severe industrial accidents should be transfused in the factory, the victims of the airplane crash on the site of the incident, battle casualties as near the front line as possible. After the transfusion has been started the patient may be transferred to a hospital for surgical treatment, and the transfusion carried on in the ambulance. It is in this way sometimes possible to prevent a serious fall of blood pressure and resulting renal damage. Recently, of 4 patients with extensive burns, 3 were transfused before a fall in blood pressure had occurred. Subsequently they showed only minimum impairment of renal function. The fourth patient received no transfusion until cleaning up in the theater was almost complete and the blood pressure was unobtainable. Renal impairment in this patient was considerable and he subsequently died.

It is perhaps difficult to define what constitutes a severe injury. Any compound fracture, especially compound fracture of the femur, multiple fractures, severe lacerations of large areas of muscle, crush injuries and second degree burns of an area bigger than one hand, should all be regarded as severe injuries requiring transfusion irrespective of the clinical condition and the blood pressure level.

Though, as already stated, the majority of casualties are healthy persons, it is inevitable that bombs should sometimes fall on the old and infirm. The treatment of elderly subjects who have become casualties presents certain difficulties. Is the woman of 60 with auricular fibrillation or the man of 70 with bronchitis and evidence of hypertension to be transfused with large quantities of blood or derivatives? If they are not transfused they will die of circulatory failure; therefore the risk of overloading an already damaged heart by forcing fluids into damaged vessels must be taken. In practice such patients have often stood transfusion extremely well.

TRANSFUSION FLUIDS

1. *Blood Substitutes.*—Such substitutes as pectin and isinglass have not been used. No opinion can therefore be expressed as to their value in the treatment of circulatory failure following injury. No use has been made of saline solution, as adequate supplies of blood and blood derivatives have always been available and are theoretically more suitable.

2. *Blood.*—In discussing the relative values of blood and derivatives it is important to distinguish between immediate and late transfusion therapy following injury. The transfusion unit called to the scene of an incident usually carries stored blood and serum or plasma. The bigger hospitals are also stocked with both blood and derivatives, the former in small quantities.

(i) Immediate Transfusion: Experience has shown that serum and plasma are adequate for the immediate transfusion of all patients suffering from circulatory collapse following injury. There is an impression among surgeons that such patients do better when given blood, but there is no evidence to substantiate this. In one district in London all air raid casualties over a period of months were treated with derivatives only, no blood was made available and the results compared favorably with those obtained elsewhere.[2]

In practice it is usual to give one or more bottles of serum or plasma followed by one or more bottles of stored blood if this is available. Transfusion depots, however, do not all now hold large stocks of blood. In some only enough blood is kept in stock to cover day to day needs and small air raid incidents, since derivatives made from out of date blood are less satisfactory than those made from fresh blood taken especially for the purpose. In the event of a sudden large scale emergency, derivatives are used with every confidence for the first twelve hours, during which time additional supplies of blood are collected and made available for subsequent use.

(ii) Late Transfusion: The importance of transfusion therapy in the first twenty-four hours following injury is now generally recognized; its importance in the later stage is less well appreciated. It has, however, been found that following injury anemia develops with remarkable frequency. This is particularly true in the case of burns. This anemia may be extremely severe when associated with extensive burns, as shown in the case to be reported but is found in milder degree following less serious burns. Two patients who had second and third degree burns of the hands and face only showed a fall in hemoglobin from 100 per cent (Haldane) to 70 per cent (Haldane) within eight days. This was associated with the appearance of nucleated red cells in the peripheral blood in 1 patient. The cause of this anemia, its occurrence and its nature require further study but are not for discussion here. It must, however, be looked for in all cases and obviously requires treatment with blood rather than derivatives. On theoretical grounds it might be argued that fresh blood should be transfused at this stage largely because sepsis is often present and leukocytes, which may be of

1. Grant, R. T., and Reeve, E. B.: Brit. M. J. **2**: 293 (Aug. 30), 329 (Sept. 6) 1941.

2. Brown, H. A., and Mollison, P. L.: Brit. M. J. **2**: 821 (Dec. 14) 1940.

value, rapidly deteriorate in stored blood. No controlled experiments have, however, been carried out to prove that fresh blood is preferable to stored blood even in such cases. Many patients have indeed done extremely well who have received preparations of concentrated red cells prepared from stored blood.

Stored Blood.—For routine purposes 420 cc. of blood is taken into an anticoagulant mixture consisting of 100 cc. of 3 per cent sodium citrate in distilled water to which is added 20 cc. of 15 per cent dextrose in distilled water. The survival rate of the red cells in this preservative is satisfactory up to fourteen days. Recently a more acid dextrose citrate diluent has been used which gives satisfactory survival up to twenty-one days at least.[3] For emergency use only group O blood is stored and issued. For the treatment of anemia that may develop later, blood of the same group as the donor is supplied whenever possible. A rigid technic for the determination of blood groups is adopted by all the blood supply depots organized by the Ministry of Health and Medical Research Council.[4] When trained personnel are available, direct matching of the donor's cells against the recipient's serum is carried out. High standards in grouping technic have proved to be a basic requirement of any efficient transfusion service.

BLOOD DERIVATIVES

In treating large numbers of severely injured patients when speedy action is essential, derivatives have the advantage over blood that they can be given without preliminary cross matching. For this reason it is usual to start treatment immediately with plasma or serum and, while the first one or two bottles are running in, cross matching may be carried out, and if further fluid is available and required, blood known to be compatible may then be given. Serum and plasma have been used extensively since the spring of 1940 in both fluid and dried form. All observers agree that the clinical results obtained are equally satisfactory with all preparations. Actual records are available of 1,600 bottles of serum and 368 of plasma used in the area served by the Northwest London Blood Supply Depot for the treatment of acute cases. No severe or alarming reaction of any sort was reported. In a few instances there was some rise of temperature, a rigor or vomiting, but such incidents are not unlikely to occur without transfusion in the severely injured patient who may also have had a general anesthetic. Reactions of a more severe sort have been noted in medical patients, such as those with nephrosis or ulcerative colitis, to whom derivatives have been given to raise the serum protein level. The cause of such reactions is obscure and is being further investigated: the problem is clearly an academic one, since reactions are not seen in the traumatic cases for which derivatives are at present needed. From the clinical point of view, dried are to be preferred to fluid preparations for the following reasons:

i. A dried preparation is always sterile, while it is less easy to be sure of sterility in fluid preparations.

ii. The concentration of protein given can be varied by altering the amount of diluent added. This is of considerable importance especially in the treatment of burns, as will be discussed later.

iii. Different diluents may be used for reconstituting the dried products; for instance, distilled water, dextrose or saline solution may be added.

Concentration of Derivative.—For patients with circulatory collapse following operation, delivery or trauma, apart from burns and possibly crush injuries, derivatives are used in normal concentration. The circulatory collapse associated with injury other than burns or crush is dependent on a reduction in circulating blood volume due to loss of fluid, either into the tissues or externally. This fluid in the great majority of cases is probably whole blood, since hemoconcentration is not seen.[1] In order to restore this volume it is essential to administer fluid as well as protein and salts. Theoretically fluid might be administered by mouth and the protein and salts given in concentrated form by intravenous injection; but for severely injured patients who may be delirious, vomiting or unable to help themselves it is much simpler to administer fluid by the same route as other necessary therapy. These derivatives are given in normal concentration in an attempt to supply protein, salts and fluid.

In the case of burns the situation is different. Hemoconcentration is almost invariably present. Even when only such a small area as one hand is burnt some degree of hemoconcentration is often found. This is due to loss of fluid into the skin and subcutaneous tissues and to actual exudation from the burnt areas.[5] The immediate need is to replace fluid and reduce the hemoconcentration. For this purpose it is clearly better to use derivatives than whole blood which will add cells to the already concentrated circulating fluid. Proteins as well as fluid, however, pass out into the burnt areas and need replacement; it is therefore an advantage to give at least a twice concentrated derivative. The use of concentrated derivatives has been found in practice to serve a further important function, since it reduces the local edema present in the burnt areas. Such reduction, especially of the facial edema, is difficult to assess accurately. Two patients were seen recently who had second and third degree burns of the face and hands: one had also a compound fracture of the right tibia and fibula and the other an injury to his right knee. Both were treated with approximately 1 liter of twice concentrated serum on admission. Fifteen hours later one was given a further 400 cc. of three times concentrated serum with the object of reducing the facial edema, since both the blood pressure and hemoglobin levels were satisfactory. Within a few hours there was a definite difference between the faces of the 2 patients. The man who had received further doses of concentrated serum was much less tense and swollen than the one who had not. The difference in their general condition was equally definite. Unless certain special preparations are used, more than twice concentrated derivatives are rather viscid.

In transfusing a severely shocked patient when it may anyhow be difficult to maintain an adequate rate of flow, this is a disadvantage. In practice, therefore, in the Northwest London area it is usual to give patients with burns an initial dose of twice concentrated serum followed, especially if the face is affected, by further treatment with three or four times concentrated serum. At the same time every effort is made to ensure as large an intake of fluid by mouth as possible.

It has been found that patients with burns affecting only a small area of the body surface, such as one hand, may often show some degree of hemoconcentration. An initial transfusion of about 800 cc. of twice concentrated derivative is therefore now given to all such patients.

3. Loutit, J. F.; Mollison, P. L.; Murray, H., and Young, I. M.: Personal communication to the author.

4. The Determination of Blood Groups, Medical Research Council War Memorandum No. 9, London, His Majesty's Stationery Office, 1943.

5. Leach, E. H.; Peters, R. A., and Rossiter, R. J.: J. Exper. Physiol. **32**: 67, 1943.

Diluent for Blood Derivatives.—Satisfactory results are obtained with distilled water, isotonic solution of sodium chloride and dextrose solution as a diluent for blood derivatives. In the case of burns it is, however, a great advantage to use dextrose wherever possible. If only fluid derivatives are available, 10 cc. of 50 per cent dextrose may be added to each bottle of derivative (containing 400 cc. of fluid). If dried products are used they may be dissolved in 5 per cent dextrose. It has been found that patients vomit less and are in better general condition during the first forty-eight hours when dextrose rather than distilled water is used. This is possibly due to the effect of dextrose in mitigating liver damage.[6]

DOSAGE

Immediate Transfusion.—No hard and fast rule can be laid down for dosage of blood or derivatives. Each patient must be treated individually and should be watched throughout the transfusion, serial blood pressure readings being made. If the patient when first seen has a low blood pressure, enough fluid must be given to raise the blood pressure to 100 mm. of mercury and maintain it at that level for half an hour before the patient is allowed to go to the operating theater. When possible the transfusion should be continued throughout the operation and on the return to the ward. For some patients 500 cc. may be sufficient to raise and maintain the blood pressure; for others it may be necessary to give 2 to 4 liters to raise the pressure and more will be required to maintain it during the period of operation. No case should be regarded as hopeless until at least 3 liters has been given without any rise in pressure or clinical improvement. To a patient with a severe injury but an initial high pressure at least 1 liter should be given before allowing the patient to go to the theater and more during the operation. The pressure of such patients often falls to normal levels while the transfusion is in progress. The pulse rate has proved a most unreliable guide to treatment. Both fast and slow pulse rates have been found in association with a low blood pressure. As the blood pressure rises the pulse rate may, if it is already rapid, become slower or, if originally slow, it may quicken. Of patients in whom it is impossible to take a blood pressure because, for instance, both arms are broken the quality of the pulse may give some indication of the quantity of fluid to be administered; but serial blood pressure readings should never be omitted even under the most adverse circumstances if they can possibly be obtained. Hemoconcentration is rarely if ever found except following burns or crush injuries. From the point of view of treatment and apart from the collection of data which may be of value in our understanding of the general pathology of the effects of injury, serial hemoglobin readings are of little value in the acute stage following simple trauma. In the case of burns and crush injuries they are an essential guide to treatment. An attempt should be made to take serial hemoglobin readings at at least two hourly intervals for the first twenty-four hours even under the most adverse circumstances. In such cases derivatives must be administered until the hemoglobin level is at or below 100 per cent (Haldane). If the blood pressure is then also satisfactory the transfusion may be stopped or the rate reduced to an extremely slow drip. Further observations must, however, be made to ensure that hemoconcentration does not recur. If it does, further fluid must be given. Additional interesting information is obtained if it is possible to take hematocrit readings. It must, however, be remembered that the number of veins of the severely injured patients are often limited, centrifuges are not always available and personnel are insufficient when many burns have to be attended to at once. Unless red cell counts are also done, the hematocrit reading is likely to be misleading.[7] In practice, hemoglobin determinations alone have proved a satisfactory guide to treatment in the acute stage.

Experience has shown that there is little risk of overdosage, while many lives have undoubtedly been lost by underdosage. A patient with extremely severe burns was given 25 pints of serum in forty-eight hours because whenever the transfusion was stopped he became restless, the blood pressure fell and hemoconcentration occurred: when the transfusion was resumed the patient slept quietly, the blood pressure rose and the hemoglobin fell to normal levels. At postmortem no fluid was found in the body cavities, and lung tissue floated. Considerable amounts of fluid were found, however, in the muscles. The risk of causing edema of the lungs appears to be extremely slight.

Late Transfusion.—In the case of later transfusion therapy it is essential to have available daily red and white cell counts, hemoglobin determinations and protein estimations. Anemia developing at the end of the second or third week associated with hypoproteinemia is commonly seen in burns. Leukocytosis is usually found, but a white cell count of under 2,000 per cubic millimeter may occur, unassociated with sulfonamide therapy. At this stage, as already stated, whole blood should be given in doses sufficient to maintain a satisfactory hemoglobin, white cell and protein level. Again no rule for dosage can be given; each case must be judged on its merits. It must be remembered, however, that repeated large transfusions are often necessary. The most satisfactory results are obtained with blood of the same group as the patient rather than with universal donor blood. Transfusions must be continued in some instances at intervals over several weeks. Some of these points are illustrated by the subjoined case report and the accompanying chart.

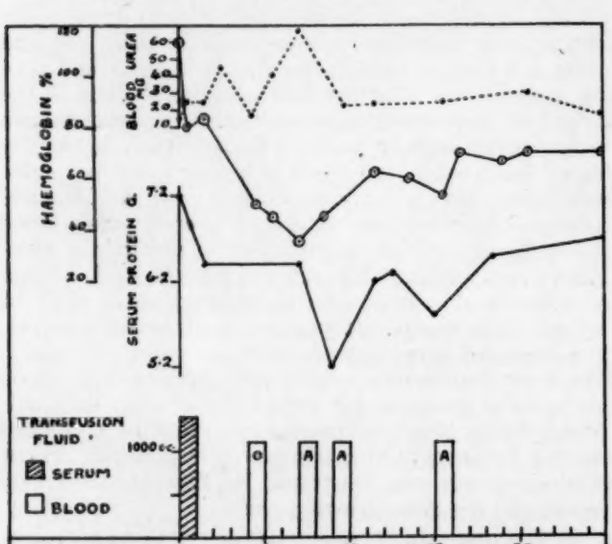
M. S., a man aged 28, was burned at 7 p. m. by his clothes catching fire. At 10:30 he was admitted to the hospital. The blood pressure was 130 systolic, 78 diastolic. There were second degree burns with small areas of third degree of the neck, back, buttocks, both legs, upper arms, hands and wrists. At 11:30 p. m. cleaning up was begun in the theater with saline solution and 1 per cent gentian violet. Tanning was done with 10 per cent gentian violet and gentian violet jelly. Sulfanilamide powder and tulle gras were employed on the hands and round the anus. At 12:30 transfusion was started while the patient was still in the theater. The hemoglobin prior to transfusion was 120 per cent (Haldane). Further blood pressure readings were unobtainable owing to dressings. The patient was returned to the ward at 1:30 a. m. During the first twelve hours 1,500 cc. of twice concentrated serum was given, and during this period the hemoglobin fell to 80 per cent. The patient was taking fluids well by mouth and was not vomiting. Two days later he developed a cough and signs in his chest and he was given sulfapyridine 4 grains (0.25 Gm.) every four hours. On the fifth day the hemoglobin was 50 per cent and the red cell count 2,500,000 per cubic millimeter. He was given 2 pints of fresh group O blood. The count continued to fall and on the seventh day his hemoglobin had fallen to 36 per cent; red cells numbered 1,700,000 and white cells numbered 40,000. There were 29 nucleated red cells per hundred white cells, many of them extremely immature. The serum protein was 6.4 Gm. per hundred cubic centimeters and the blood urea 66 mg. per hundred cubic centimeters. Two pints

6. Wilson, W. C.; Macgregor, A. R., and Stewart, C. P.: Brit. J. Surg. **25**: 826 (April) 1938.

7. Brown, G. L.; Miles, J. A. R.; Vaughan, Janet M., and Whitby, L. E. H.: Brit. M. J. **1**: 99 (Jan. 24) 1942.

of group A blood, the patient being group A, was given with some improvement in the hemoglobin and serum protein and a fall in the blood urea. The rise in hemoglobin was, however, slight and there was a further fall in serum protein to 5.2 Gm. per hundred cubic centimeters, the albumin fraction being greatly reduced. He was given a further 2 pints on the tenth day and a further 2 pints on the sixteenth day. After this point the hemoglobin and protein rose steadily to a satisfactory level, which was maintained. Throughout the period of observation urinary output was satisfactory, though albumin, hyaline casts and urobilin were present during the first few days. Serum bilirubin reached a maximum figure of 2.85 on the third day and then fell, being below 1 mg. on the ninth day, though the urine still contained much urobilin. Detailed bacteriologic investigations were not made, as facilities were not available. Hemolytic streptococci were not found.

It is recognized that this patient should have been transfused before he went to the theater and that in the later stage he should theoretically have been given larger transfusions to produce a more rapid rise of hemoglobin. He had, however, only one vein available, all the rest of the body being burnt, This vein was in the antecubital fossa with burns above and below, and as the patient was nursed on his face it was something



Hemoglobin, serum protein and blood urea levels in a patient with severe burns treated with serum and blood transfusion.

of a gymnastic feat to insert the needle and not too easy to retain it in position for long periods. It might be commented that in this case the sulfapyridine was a complicating factor. It may have been, but anemia has also been noted in patients who have not received sulfonamide drugs. The patient made an excellent recovery.

RATE OF ADMINISTRATION

Immediate Transfusion.—As already stated, the type of patient under consideration is usually healthy. The rapid administration of at least a liter of fluid does not cause cardiac embarrassment. It is safe and often essential to give this quantity in the first half hour; further amounts may then be given at a drip rate depending on the level of the blood pressure. It is often necessary to give this initial volume with the help of pressure, since circulatory failure may have led to complete collapse of the veins and gravity alone is insufficient to cause a free flow of fluid. Later the flow usually becomes satisfactory with gravity. Pressure is most readily applied by means of a Higginson syringe or other form of rubber bulb attached to the air entry tube of the transfusion bottle. The use of pressure has proved particularly important when the veins of the leg are used, since even if they are not collapsed these veins are liable to undergo spasm, especially when serum is used.

Late Transfusion.—After the first twenty-four hours, all transfusions should be given at a slow drip rate.

SITE OF ADMINISTRATION

The vein in the antecubital fossa, though often the most obvious, is not the site of choice. Even though the arm is splinted the restless patient is likely to bend the arm slightly and in so doing jerk the needle out of position. A splint also adds to the patient's general discomfort. If possible a small vein on the front of the forearm should be used. When the needle is in the vein the rubber tubing is curled round and strapped in position so that no direct pull is exerted on the needle if the tubing above the needle is jerked. The patient is also able to move the arm freely without affecting the position of the needle. The stability of the apparatus is of considerable consequence, since it is important to start transfusion as soon after injury as possible though the patient may have to be moved considerable distances immediately it has been begun. In adults, especially if the arm is first warmed by the application of a hot water bottle, no difficulty is usually experienced in finding the veins of the forearm.

If both arms are injured and the leg has to be used, it is wise to cut down and insert a cannula into the internal saphenous vein without trying to perform a venipuncture. Pressure will almost always be required to maintain an adequate flow of fluid for at least the first 500 cc. when a leg vein is used.

If a patient has been severely burnt no vein may be available. Fluid can then be administered by the sternal route. Indeed this has often proved to be a life saving measure. The Salah or other sternal puncture needle should be regarded as a routine piece of equipment for every resuscitation team. If no special needle is available a sawed off lumbar puncture needle may be used. The needle is passed into the sternal cavity in the usual way, filled with sterile saline or citrate solution by means of a syringe and connected with the routine administering unit. If pressure is not applied, 400 to 500 cc. can be usually given by this route in about forty minutes. If pressure is applied the rate is quickened. The needle may sometimes appear to get blocked, but if one changes the position of the needle without actually withdrawing it the flow usually is restored. Large quantities may be given successfully by this route.

CONCLUSION

This paper has been concerned with only one aspect of the treatment of the severely injured patient, namely transfusion. The personnel of a transfusion unit must, however, be prepared to administer and control other measures adopted for the resuscitation of casualties. The use of heat or cold, of oxygen and of sedatives and the administration of fluids by mouth must all be considered and adjusted to meet the needs of each particular patient, special attention being paid to both respiratory and renal function. A satisfactory blood pressure and hemoglobin level is of little value if associated with greatly reduced urinary output. Further, the necessity of the closest cooperation in all aspects of treatment between the resuscitation unit, the surgical unit and the anesthetist must be recognized if the best results are to be obtained.

It may be concluded that much has been learnt in the last four years about transfusion therapy, following severe trauma. The use of massive dosage of both blood and of high quality derivatives and the recognition of the late development of anemia has greatly increased the chance of survival of the severely injured person. It is, however, clear that there is still much that is obscure about the underlying disturbances of function that result from such injuries. Why do some individuals require only 400 cc. and others several liters to restore their circulation? Why does severe injury result in impairment of renal function? Why does even a small burn lead to the development of anemia?

Careful and detailed studies carried out under optimum working conditions rather than under emergency conditions, on human beings rather than on animals, are required. The accident wards of any large hospital should provide the necessary material. Even under emergency conditions it has been shown that the best results are obtained only by a careful study and analysis of factors such as the blood pressure and hemoglobin in each individual patient. Controlled though simple observations rather than clinical judgment are the necessary guides to transfusion therapy.

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TOXIC NECROSIS OF THE LIVER FROM TRINITROTOLUENE

REPORT OF THREE CASES

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Trinitrotoluene poisoning is primarily a civilian wartime problem. In the first world war there occurred among the munition workers in several plants in the United States 17,000 instances of poisoning with 475 deaths.[1] Apparently in the present conflict the incidence is much lower, although no statistics are available as yet. Doubtless there are many reasons for the improvement. Roberts,[2] Bedford[3] and other British physicians[4] have emphasized the important role of the physician in the prevention of disease by careful selection of workers, determination of their condition at the time of employment and constant supervision. In the modern munition plants every effort is made to protect the worker. The employees are provided with freshly laundered uniforms daily; a shower bath is required at the end of the work period; ventilation has been improved; respirators have been provided in some instances; but nevertheless exposure to dust and fumes is sometimes excessive. Evans[5] observed 7 cases of jaundice, 2 of them fatal, in one factory in England in 1941. Toxic necrosis of the liver is one of the rarer manifestations of trinitrotoluene poisoning, but it is fatal in approximately one third of the patients so afflicted.[6] The present cases are reported to emphasize the problems involved. Similar isolated instances are probably occurring among munition workers throughout the country.

REPORT OF CASES

CASE 1.—R., a man aged 46, was admitted to the hospital on May 3, 1943 because of progressive jaundice of five or six weeks' duration accompanied in the last two weeks by weakness, a 15 pound (6.8 Kg.) loss of weight, and clay colored stools. For two and one-half months prior to the onset of the jaundice the patient had been employed in an ordnance plant engaged in the loading of shells with trinitrotoluene and other explosives.

The record disclosed that for the first three and a half weeks of his employment the patient was not exposed to trinitrotoluene in any form. For thirteen days, from Feb. 4 to Feb. 18, 1943 he spent a total of ninety-five hours in a "cubicle" tending a vat of a fuming mixture of trinitrotoluene. "Sores" in the nostrils appeared during this period. These would bleed and crust over and were attributed by the patient to the fumes. From February 19 to April 20 the patient had little or no exposure to explosive, being engaged in the baling of empty cardboard boxes, some of which, although cleaned, may nevertheless have been contaminated with particles of powder. Weakness, fatigability and shortness of breath developed as the jaundice progressed. A local physician prescribed a "liquid medicine and some green pills." The patient continued to work until two weeks before admission to the hospital.

On admission there was some dull, boring, intermittent but not colicky pain in the left hypochondrium. The patient's past history and the systemic inquiry yielded no relevant information. Physical examination revealed that the patient was well nourished, well developed and deeply jaundiced. He weighed 170 pounds (77 Kg.). The spleen was not palpated. The lower border of the liver was palpable about 6 cm. below the costal border in the right midclavicular line. The blood picture was normal and remained so. During the first week of hospitalization the oral temperature fluctuated between 99 and 100 F. and then remained normal. The blood Wassermann and Kahn reactions were negative. On two occasions the red blood count was 5,000,000 with a hemoglobin of 15 Gm. and a white cell count of 8,200, containing 63 per cent polymorphonuclears, 9 per cent large lymphocytes, 15 per cent small lymphocytes and 13 per cent mononuclear cells. Repeated urinalyses were normal except for the presence of bile. Urobilinogen was present. Bile was absent from the stool on admission but soon returned. The dextrose tolerance test on May 8th gave the readings as follows: 8:45 a. m., blood sugar 75 mg. per hundred cubic centimeters; 9:15, 125 mg.; 9:55, 143 mg.; 10:45, 112 mg. The tests of hepatic function are given in table 1.[7] The Webster test performed by Dr. E. S. Guzman Barron was negative.

The treatment consisted of rest in bed and a high carbohydrate, moderately high protein and low fat diet supplemented by the intravenous infusion of dextrose, the patient receiving 1,500 cc. of 10 per cent dextrose in distilled water or isotonic solution of sodium chloride intravenously on May 4, 6, 7, 8, 10, 11 and 12.' His appetite continued good, enabling him to eat from 1,500 to 2,500 calories daily (approximately 400 Gm.

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of carbohydrate, 100 Gm. of protein and 20 Gm. of fat). Twenty-five mg. of synkayvite [8] was given intramuscularly on May 5.

On May 8, at the suggestion of Dr. E. S. Guzman Barron, 180 mg. of cystine hydrochloride dissolved in 50 cc. of isotonic solution of sodium chloride and neutralized with 0.5 normal sodium bicarbonate was given intravenously. Vitamin B was administered daily beginning on the twelfth day of hospitalization and crude liver extract daily beginning with the seventeenth day. The patient's condition had definitely improved, however, before either of the latter medications was given. The jaundice gradually subsided, and the tests of liver function returned to normal. The patient was discharged on June 5. He returned on June 28 for x-ray examinations, which disclosed a normal visualization of the gallbladder, after the administration of dye, without evidence of stone, and a normal esophagus, stomach, duodenal bulb, terminal ileum and colon.

decreased, as may be seen from the level of the serum bilirubin in table 2. The appetite returned rather rapidly, as did the patient's sense of well being. Treatment consisted of rest, a high carbohydrate moderately high protein and low fat diet (approximately 300 Gm. of carbohydrate, 75 Gm. of protein and 15 Gm. of fat daily). No medication of any kind was prescribed. After the subsidence of the jaundice the gallbladder visualized normally roentgenologically.

The patient had been employed in an ordnance plant since January 1943. In January, February, May and June her only contact with explosives was the slight one occasioned by dealing with patients whose clothes were contaminated with explosives other than trinitrotoluene. In March, April and July she worked in a first aid room in which she came in contact with patients whose clothes were probably contaminated with mixtures of trinitrotoluene and ate two meals a day in a concrete bombshelter often crowded with these workers. The air in this

TABLE 1.—*Laboratory Studies in Case 1*

Date	Bilirubin [a]			Cholesterol [b]	Cholesterol Esters	Prothrombin [c]	Proteins [d]			Fibrinogen	Hippuric Acid Excretion, [e] Gm.	Galactose Tolerance, [f] Gm.
	Direct, Mg. per 100 Cc.	Indirect, Mg. per 100 Cc.	Per Cent				Total, Gm. per 100 Cc.	Albumin, Gm. per 100 Cc.	Globulin, Gm. per 100 Cc.			
5/ 4	21.6	23.2	93	160	20	51%	6.48	3.71	2.77	0.38	0.11	7.0
5/ 7	....	....	..	145	16	....	....	....	....	....	....	....
5/10	19.5	26.6	73	....	..	....	....	....	....	....	....	....
5/12	....	....	..	....	..	75.6	....	....	....	....	0.48	....
5/13	....	....	..	....	..	100	....	....	....	....	....	....
5/14	....	....	..	130	10	100	....	....	....	....	....	....
5/17	15.5	22.7	68	155	16	100	6.38	3.50	2.88	0.37	....	....
5/22	....	....	..	165	20	....	7.3	3.70	3.6	....	....	....
5/23	....	....	..	....	..	....	....	....	....	....	0.92	....
5/25	7.4	9.8	76	185	46	....	....	....	....	0.42	....	....
5/28	....	....	..	195	69	....	7.5	4.18	3.32	....	....	....
5/30	....	....	..	....	..	....	....	....	....	....	....	0.99
6/ 1	4.1	5.6	73	210	85	....	7.18	3.91	3.27	....	....	....
6/ 4	....	....	..	....	..	....	....	....	....	....	0.82	....
6/28	1.1	1.8	61	135	56	78	6.77	4.44	2.33	0.31	0.97	1.8
8/12	Normal	Normal	..	150	63	....	....	....	....	....	1.01	....
8/30	Normal	Normal	..	160	73	88	6.74	4.38	2.36	....	....	0.99

References to laboratory methods are given in footnote 7.

TABLE 2.—*Laboratory Studies in Case 2*

Date	Bilirubin			Cholesterol	Cholesterol Esters	Prothrombin	Proteins			Fibrinogen	Hippuric Acid Excretion, Gm.	Galactose Tolerance, Gm.
	Direct, Mg. per 100 Cc.	Indirect, Mg. per 100 Cc.	Per Cent				Total, Gm. per 100 Cc.	Albumin, Gm. per 100 Cc.	Globulin, Gm. per 100 Cc.			
7/26	10.9	14.3	76	170	33	100%	6.24	4.66	1.58	0.27	....	....
7/27	....	....	..	....	..	....	....	....	....	....	0.5	....
7/28	14.0	17.0	82	170	30	100	5.29	4.43	0.86	....	....	2.86
7/31	17.6	21.8	81	....	..	....	....	....	....	....	0.31	....
8/ 2	14.3	17.6	81	....	..	....	....	....	....	....	....	....
8/ 3	13.4	16.9	79	210	38	....	6.01	4.49	1.52	....	0.5	....
8/ 4	....	....	..	....	..	....	....	....	....	....	....	2.17
8/ 5	7.4	10.0	74	....	..	....	....	....	....	....	....	....
8/ 7	5.9	8.1	73	....	..	....	....	....	....	....	....	....
8/ 9	5.2	6.9	75	190	83	100	6.69	4.76	1.84	....	0.86	....
8/10	....	....	..	....	..	....	....	....	....	....	....	2.43
8/12	3.8	4.6	83	....	..	....	....	....	....	....	....	....
8/14	2.9	3.6	81	....	..	....	....	....	....	....	....	....
8/31	1.22	1.52	80	180	88	95	6.91	5.22	1.69	....	1.25	....

CASE 2.—L., a woman aged 22, married, a nurse, entered the hospital on July 25, 1943 because of weakness, nausea, vomiting and jaundice. She dated the onset of her illness to six days before admission, when she noted that the scleras were tinged with yellow. On the second day her temperature rose to 99.4 F. On the morning of the third day nausea and vomiting appeared. There was no recurrence of the vomiting subsequently, but the tendency to nausea persisted. The jaundice progressively deepened.

The physical examination on admission disclosed normal findings except for a moderately intense icterus. The liver was palpable on deep inspiration 2 fingerbreadths below the costal border in the right midclavicular line. Its edge was sharp, its surface smooth, slightly tender. The urine on admission was strongly positive for urobilinogen and bile. The Wassermann and Kahn reactions were negative. The red blood cell count was 4.65 million with a hemoglobin of 13 Gm. and a white cell count of 7,150. The patient remained in the hospital for twenty days, during which time the jaundice increased and then

8. The tetrasodium salt of the diphosphoric acid ester of 2-methyl-1, 4-naphthohydroquinone.

bombshelter is known to contain the dust of trinitrotoluene. She had used two different types of "leg makeup," but there seems to be no reason to suspect these of causing the jaundice. The patient had always been well previously and had been in excellent health before the appearance of the jaundice, although for a month she had lost considerable sleep because of family worries.

CASE 3.—B., a man aged 63, entered the hospital on June 9, 1943 listing the following complaints: fatigue, attacks of fainting and prostration, yellow finger nails, jaundice, belching, rumbling in the abdomen, flatus, nocturia, epigastric and umbilical pain, somnolence, swollen ankles, puffy eyes, cramping of the right hand and forearm, and a bad taste in the mouth. The patient had been employed as a sweeper and cleaner in a men's dressing room in an ordnance plant from Jan. 17 to March 14, 1943. He came in contact with men wearing clothes contaminated with mixtures of explosives but was not directly exposed to the dust or fumes of trinitrotoluene during this period. On March 15 he changed jobs and for two months was exposed more or less continuously during his working hours to either the powder or the fumes of trinitrotoluene.

About two weeks after he changed jobs he noticed a slight fatigue, which persisted. This was not severe and did not interfere a great deal with his work. About one week after the onset of this fatigue he experienced an acute attack of fainting, dizziness and prostration. He was taken to the first aid station, where he quickly recovered and returned to work. A second such attack occurred some days later. A week or two after this a yellowish discoloration of the finger nails appeared and persisted. About four weeks prior to admission the patient experienced a third sudden attack of fainting with vomiting, but without nausea or pain. The physician at the first aid station remarked that the scleras were icteric and the skin of the body "pinker than normal" and sent the patient home. Apparently the local physician prescribed iron and vitamins. The patient could not tolerate the iron pills, so they were stopped after one week. Daily intravenous infusions of dextrose were given for three weeks at home. During the four weeks at home the patient complained of belching, rumbling and gurgling in the abdomen and excessive amounts of flatus. There was no diarrhea, constipation or change in the color of the stool. A dull, gnawing epigastric pain appeared about three weeks prior to admission to the hospital. It was rather irregular in its appearance but frequently came one or two hours after eating, was relieved by eating, and occasionally wakened him between 1 and 2 a. m.

The physical examination on admission revealed slight icterus, with some yellow staining of the finger nails and a residual inflammation and pigmentation of the skin about the ankles, which the patient stated he had had for some time. On deep inspiration the liver was palpable a good fingerbreadth below the costal border in the right midclavicular line. The edge was sharp, the surface smooth and not tender. The spleen was not palpated. The Webster test performed on the urine and on bits of tissue scraped from around the finger nails was negative. The urinalysis was normal. The red blood cell count was 4.75 million with a hemoglobin of 14 Gm. and a white cell count of 8,100. The patient remained in the hospital for nineteen days, during which time his course was rather uneventful. The listlessness disappeared slowly, as did the slight icterus. The tests of hepatic function and other laboratory procedures are shown in table 3. Treatment consisted of a high carbohydrate, moderately high protein, low fat diet (carbohydrate 400 Gm., protein 100 Gm. and fat 30 Gm.) plus the administration of multiple vitamins. Initial x-ray examinations disclosed a nonvisualization of the gallbladder and suggested also a deformity of the duodenal bulb. However, on subsequent examinations the esophagus, stomach and duodenum were found to be normal and a faint but presumably normal visualization of the gallbladder was obtained. At the time of the patient's discharge from the hospital he was entirely free of jaundice and felt quite well.

TABLE 3.—*Laboratory Studies in Case 3*

Date	Bilirubin		Cholesterol	Cholesterol Esters	Prothrombin	Proteins			Fibrinogen	Hippuric Acid Excretion, Gm.	Galactose Tolerance, Gm.
	Direct, Mg. per 100 Cc.	Indirect, Mg. per 100 Cc.				Total, Gm. per 100 Cc.	Albumin, Gm. per 100 Cc.	Globulin, Gm. per 100 Cc.			
6/ 9	2.1	3.0	215	60	100%	5.93	3.0	2.93	0.25	0.26	....
6/16	1.16	1.54	170	53	....	5.06	2.40	2.66	....	0.51	3.7
6/22	Normal	1.4	155	53	90	5.81	2.66	3.15	0.27	0.58	4.3 and 4.0
7/26	Normal	Normal	....	..	78	5.78	4.07	1.71	....	....	....
7/27	Normal	Normal	180	85	78	....	....	....	....	1.00	0.5
7/29	.....	.....	....	..	97	....	....	....	....	....	....
9/ 7	Normal	Normal	190	105	94	5.78	3.27	2.51	....	0.10*	2.56

* Small urine volume—incomplete collection? Patient clinically well.

COMMENT

The diagnosis of trinitrotoluene poisoning in these cases is based primarily on circumstantial evidence, jaundice of the parenchymal type occurring in persons exposed to trinitrotoluene compounds. In case 1 the exposure was considerable, in case 2 relatively slight and in case 3 rather great. Cases 1 and 2 were on the whole indistinguishable from acute catarrhal jaundice; indeed, the possibility that they were in fact infectious jaundice cannot be denied. One of us (W. L. P.) has seen during almost the same period of time 3 similar cases of jaundice occurring in civilians not known to have been exposed to any toxic substance and therefore presumed to be infectious in origin. In case 3, however, the clinical evidence incriminating trinitrotoluene seems conclusive. There was a history of rather heavy exposure for two months; the first symptoms, according to the patient, appeared about two weeks after the beginning of this exposure. The yellowish discoloration of the fingernails produced by the powder was observed; the "pink" color of the skin remarked on by the physician at the first aid station is suggestive of anilism; the anorexia, nausea, vomiting, epigastric and abdominal pain are characteristic of the so-called trinitrotoluene gastritis; the mild icterus with recorded abnormalities of hepatic function are, in our opinion, more suggestive of "toxic" than of infectious hepatitis. The failure to obtain a positive Webster test is not surprising. The absence of definite dermatitis or anilism in the first 2 cases is also not surprising for they have been absent in most of the instances of toxic necrosis of the liver hitherto reported.

We incline to the view that all 3 cases described were instances of trinitrotoluene poisoning with toxic necrosis of the liver of varying degrees. The severity of the hepatic injury in the 3 cases is evident from the intensity and duration of the jaundice and is indicated further by the percentage of cholesterol esters, the prothrombin and the excretion of hippuric acid and galactose.

Although recovery might have occurred without any of the treatment employed, we nevertheless believe that the accumulated experimental and clinical evidence in favor of a high carbohydrate, moderately high protein and low fat diet to be sufficiently great to strongly justify its use.[9] It is not possible to know whether the cystine hydrochloride suggested by Dr. Barron[10] on theoretical grounds and given in case 1 was of any value or not. The second patient recovered without it, but she was not as sick, and hepatic injury, as judged by the tests of function, was much less pronounced.

SUMMARY

In 3 cases of apparent trinitrotoluene poisoning with recovery, the evidence suggests that the toxic necrosis of the liver was severe in one, moderate in the second, and slight to moderate in the third.

A residual pigmentation and inflammation of the skin of the ankles was noted in the third patient in addition to the jaundice, anilism and gastrointestinal symptoms characteristic of trinitrotoluene intoxication.

9. Ravdin, I. S.; Thorogood, Elizabeth; Riegel, Cecilia; Peters, Rozanne, and Rhoads, J. E.: The Prevention of Liver Damage and the Facilitation of Repair in the Liver by Diet, J. A. M. A. **121**: 322 (Jan. 30) 1943.

10. Barron, E. S. Guzman, and Singer, T. P.: Enzyme Systems Containing Active Sulfhydryl Groups: The Role of Gluathione, Science **97**: 356, 1943.

MAGNESIUM POISONING FOLLOWING AN ENEMA OF EPSOM SALT SOLUTION

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Poisoning due either to abuse or to idiosyncrasy is to be expected with any drug which is widely used by both practitioners and laymen. Epsom salt is one of the most commonly employed household purgatives. In spite of its general use, reports of poisonous effects from magnesium sulfate are not numerous.

Charles Fraser [1] in 1909 reviewed the literature of the period from 1841 to the time of his publication and was able to collect only 7 cases. Two of these had as prominent features nausea, vomiting, abdominal pain and distention. The 2 patients showed little or no central depression and recovered in two or three days. William Boos [2] in 1911 added 3 more cases of poisoning from magnesium sulfate, with one death. In one of these there were vomiting and obstipation. In the others the toxic effects were due to a cumulative effect of repeated doses rather than to rapid absorption of a single dose. F. E. Byron [3] in 1939 reported 5 cases of fatal poisoning following administration of magnesium sulfate solution. The patients were children between 2½ and 10 years of age who were being treated for intestinal helminthiasis, and all died within two hours. In 18 cases of poisoning by magnesium sulfate collected from the literature the illness followed oral administration of the salt. As far as we have been able to determine, toxic effects following rectal instillation of a solution of magnesium sulfate have not hitherto been reported. Following are our 2 cases of flaccid paralysis and coma coming on rapidly after an enema containing epsom salt solution. In the first case magnesium intoxication was not considered until after the patient had died; hence no confirming laboratory data are available. Although the final diagnosis of magnesium poisoning was not proved we have no hesitation in presenting it, as the circumstantial evidence is as great as for any of the fatal cases reported in the literature. Moreover, it was our knowledge of the first case which later made us alert to the possibility of magnesium poisoning in the second instance, in which we were able to verify the diagnosis and avert a fatality by administering the specific antidote.

REPORT OF CASES

CASE 1.—J. B., a 2 year old boy, was admitted for a plastic operation for imperforate anus. When 10 hours old he had undergone colostomy. The new stoma functioned well for seven months. A stricture then developed for which he had to have an operation. At the present admission he was well developed and nourished, with physical findings normal for his age. One week after entry an abdominoperineal plastic operation was carried out to correct the congenital anomaly. Postoperatively pyelonephritis developed, which responded to chemotherapy, and his progress was considered satisfactory. Two months after the operation fecal impaction developed, and the impacted fecal matter was broken up by digital manipulation. Following this he was given an enema containing epsom salt solution. This was expelled, with good results. Almost immediately thereafter the patient became limp and stopped breathing. Artificial respiration and oxygen therapy were begun at once, and he received 0.5 cc. of nikethamide intramuscularly. Respirations were resumed at 28 per minute but remained shallow, irregular and entirely abdominal. The pulse rate was 130. The baby was comatose, the pupillary reflexes were absent and there was generalized flaccid paralysis. In spite of vigorous supportive measures, including intravenous injection of fluids and blood transfusion, he died a few hours later of respiratory failure. Autopsy including examination of the brain failed to reveal the cause of death.

CASE 2.—P. M., an Italian woman aged 23, single, was admitted to the emergency ward of the Massachusetts General Hospital complaining of severe cramping in the left flank and in the left lower abdominal quadrant of forty-eight hours' duration, associated with nausea and vomiting. The past history was irrelevant except for an equivocal history of rheumatic fever at the age of 15 years. On admission the physical examination gave essentially normal results except for minimal tenderness in the left flank and the left costovertebral angle. The white blood cell count was 11,000. Urinary sediment contained 50 red blood cells per high power field. A diagnosis of left ureteral calculus was made and confirmed by x-ray examination, which revealed a 0.3 cm. stone in the region of the intramural portion of the left ureter. The patient was given forced fluids and atropine sulfate preoperatively, 1/150 grain (0.43 mg.), every three hours until midnight. In preparation for an intravenous pyelogram, all fluids were withheld after midnight. The following morning the patient received one ampule of prostigmine methylsulfate 1:2,000 followed in fifteen minutes by a small "MGW enema." This enema mixture, formerly in daily use in this hospital, ordinarily consists of 2 ounces (60 cc.) of glycerin, 2 ounces of water and 2 ounces of a saturated solution of magnesium sulfate (1½ ounces [45 cc.] of the solution containing 1 ounce [28 Gm.] of the salt). In this instance the patient received at 6 a. m. a four ounce (120 cc.) enema containing 40 cc. each of the three ingredients. The full enema was retained for only two minutes. She then passed considerable fluid and a small amount of feces. Ten minutes later she had a large fluid movement and again in ten minutes a third movement, this time mostly clear fluid. On being helped from the bed pan at about 6:30 a. m. she complained to the nurse that she "felt hot all over" and was "very thirsty." At 7:15 a. m. she was found to be unresponsive, although on strong auditory and painful stimuli she could make a sound and moved her tongue as if to speak. Her systolic blood pressure was 150. The pulse was of good quality and not rapid. Her respirations were shallow and entirely abdominal. The pupils were dilated and reacted only slightly to light. Her limbs were flaccid, and there was complete loss of all the reflexes, including the corneal. There was incontinence of feces but not of urine. Respirations grew progressively more shallow, and finally no painful stimulus would evoke a response. When first seen she appeared to have lost motor power without complete loss of consciousness. Recalling that parenteral magnesium produces a curare-like effect on the peripheral neuromuscular apparatus, it was thought that the patient might be suffering from magnesium poisoning. The central depression produced by the magnesium ion is known to be completely antagonized by calcium effect. Therefore 1 Gm. of calcium gluconate was given intravenously while the patient was being moved into a room in which there was a respirator. In less than ten minutes there was an obvious improvement in her general condition. She was able to move her head, and her respirations improved so that a respirator was not needed. At this time, about 9 a. m., venous blood was taken for a serum magnesium determination. Another gram of calcium gluconate was given, and within ten minutes thereafter she was fully conscious and asking for water. By questioning it was found that she had been aware of what was

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The determinations of serum magnesium were made by Miss Dorothy M. Tibbetts of the Collis P. Huntington Memorial Hospital. Dr. J. C. Aub and Miss Tibbetts placed at our disposal some unpublished data on the absorption of magnesium in nephritic patients.

1. Fraser, Charles: Epsom Salts as a Poison, Lancet **1**: 1174, 1909.
2. Boos, W. F.: Magnesium Poisoning: A Study of Ten Cases, J. A. M. A. **55**: 2037 (Dec. 10) 1910. Priestley, J. P.: Toxic Effects of Magnesium Sulphate, New York M. J. **96**: 665, 1912.
3. Byron, F. E.: Fatal Results Following the Administration of Magnesium Sulphate, J. Malaya Br., Brit. M. A. **3**: 100, 1939.

going on around her for some time after she had been unable to move. Her most vivid recollections of the period immediately preceding her loss of consciousness were those of extreme thirst and a feeling of heat. Interestingly enough, her corneal reflex did not reappear until two or three hours later. Having passed the ureteral stone (as determined by subsequent x-ray examination) and being asymptomatic, the patient was discharged three days later.

In addition to the dramatic response to calcium, the laboratory findings confirmed the diagnosis of magnesium poisoning. The serum magnesium content of the first sample of blood, drawn approximately three hours after the enema, was 20.8 mg. per hundred cubic centimeters. Magnesium was determined by the colorimetric method of Fiske and Logan.[4] The serum calcium was 9.9 mg. per hundred cubic centimeters. A second sample of blood drawn later and analyzed by a different laboratory was reported to contain 15.4 mg. of magnesium and 11.2 mg. of calcium per hundred cubic centimeters of serum. A catheter specimen of 300 cc. of clear amber urine was obtained from the patient early in her period of unconsciousness. The magnesium content of this sample was 0.72 mg. per cubic centimeter. Soon after regaining consciousness she voided 46 cc. of urine containing 2.38 mg. of magnesium per cubic centimeter and 2.52 mg. of calcium. Hence the patient excreted about 196 mg. of magnesium in three hours. Through an oversight the specific gravity of this urine was not determined. This measurement would have been of great interest, as some of the highest values for specific gravity recorded have been obtained in cases of magnesium poisoning.

At the present time, magnesium sulfate solution is seldom administered by rectum except for its osmotic effects. It is occasionally used in the treatment of neurosurgical patients with acute cerebral edema to produce rapid dehydration. It is commonly employed in combination with glycerin and water as a cleansing enema. Contrary to the general belief that magnesium is not absorbed from such an enema, the cases reported here establish that in certain persons absorption may occur and toxic effects ensue even when epsom salt solution is administered by rectum. The high serum magnesium level in case 2 proves that the toxic effects were not the result of abnormal sensitivity to the magnesium ion but were due rather to a peculiarity of the intestinal tract which permitted rapid absorption of the salt from the rectum and colon.

Sensations of internal heat and thirst are probably valuable premonitory signs of impending magnesium poisoning.

Eight of the persons reported as showing magnesium poisoning have been children between the ages of 2½ and 10 years. Six of these died in ten to one hundred and twenty minutes after taking a solution of epsom salt. The large percentage of the total number with fatal poisoning who were children suggests that overwhelmingly rapid absorption of magnesium salts may be more common in children than in adults or that intestines infested with worms may be particularly permeable to these salts.

SUMMARY

Toxic effects followed rectal instillation of a solution of magnesium sulfate.

There is a group of patients whose intestines are peculiarly permeable to magnesium salts. In regard to these otherwise normal persons, toxic effects from magnesium sulfate cannot be predicted, but if they are recognized promptly a fatal outcome can be entirely prevented by intravenous administration of calcium.

Complaints of severe thirst and of "feeling hot all over" or the like by a patient who has been given magnesium in any form should be taken as a premonitory sign of impending magnesium poisoning in order that the administration of calcium may be instituted as soon as possible.

4. Fiske, C. H., and Logan, M. A., in Folin, Otto: Laboratory Manual of Biological Chemistry, ed. 5, New York, D. Appleton-Century Company, Inc., 1934.

REPORT OF REEXAMINATION OF 4,994 MEN DISQUALIFIED FOR GENERAL MILITARY SERVICE

BECAUSE OF THE DIAGNOSIS OF CARDIOVASCULAR DEFECTS

A COMBINED STUDY MADE BY SPECIAL MEDICAL ADVISORY BOARDS IN BOSTON, CHICAGO, NEW YORK, PHILADELPHIA AND SAN FRANCISCO

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(Continued from page 944)

The more important results of reexamination of men originally disqualified for general military service require special comment here:

A. RECLASSIFICATION AS 1A[7]

(*a*) *General Figures, Comparisons with Introduction and Borderline Cases.*—The total number of men resubmitted as 1 A among the 4,994 statistically studied in the five cities was 863, or 17.3 per cent, which includes 103 of the borderline cases already referred to (section 5). If these borderline cases were omitted, the number would be considerably reduced, to 760, or 15.2 per cent.

Chicago gave the smallest return of 1A cases resubmitted for military service (only 3.8 per cent) as the result of the procedure developed in that city in the original examinations, whereby cardiovascular experts had been freely used in the decision about doubtful cases. It would appear, therefore, at the outset that Chicago's example might profitably be followed by other examining groups throughout the country.

Boston, New York and Philadelphia turned in very similar figures for acceptance and rejection, respectively 18.8, 19.2 and 16.5 per cent and 81.2, 80.8 and 83.5 per cent. San Francisco gave a higher percentage of 1A men (28.6 per cent), in some degree, at least, as the result of acceptance of more borderline cases recorded as such (see section 5).

(*b*) *Original Rejection Diagnoses of the Cases Reclassified as 1A* (table 2).—Valvular heart disease was by far the commonest diagnosis found on the records of the men reclassified as 1A, having been the original rejection diagnosis in 299 of the 589 cases reclassified as 1A in four of the five cities: in 79 (41.4 per cent) of the 188 resubmitted cases in Boston, in 14 (36.8 per cent) of the 38 resubmitted cases in Chicago, in 109 (56.7 per cent) of the 192 1A cases in New York and in 97 (58.7 per cent) of the 165 cases in

7. See tables 1, 2 and 4.

Philadelphia. Hypertension as the original diagnosis ranked second with 133 of the 589 resubmitted cases: in 52 of the resubmitted cases in Boston, in 5 of the 38 cases in Chicago, in 43 (22.4 per cent) in New York and in 33 in Philadelphia. Tachycardia as a specific entity ranked third with 51 of the 589 resubmitted cases: 2 in Boston, 8 in Chicago, 27 (14.1 per cent) in New York and 14 in Philadelphia. Other diagnoses in approximately the order of their occurrence in the 1A group were heart disease unspecified, neurocirculatory asthenia and cardiac enlargement.

Thus it is evident that the three findings that had bothered the original examiners and had resulted in the rejection of these men were murmurs, usually a systolic blow at the apex, elevated blood pressure and increased heart rate. All of these were either not found in the reexamination or subsided on resting quietly one-half hour recumbent or were interpreted as nonpathologic and hence unimportant. However, there were in all five cities cases of these three types that were considered as probably but not certainly normal (table 4), some having been accepted for resubmission in Chicago, New York and Philadelphia and all having been lumped together in the borderline group in Boston and rejected. More of the 114 cases in the Boston group had been originally diagnosed hypertension (46) than valvular disease (30), neurocirculatory asthenia (15), heart disease unspecified (12) or tachycardia (6). The final rearrangement of possible diagnoses in the Boston borderline group was hypertension ("nervous") 70, tachycardia ("nervous") 27, doubtful valvular disease 19, doubtful cardiac enlargement 10 and miscellaneous 7.

B. REJECTION CONFIRMED

(*a*) *General Figures and Comparison.*—The great majority of all the 4,994 cases, actually 4,131, or 82.7 per cent, were confirmed in their rejection. In Chicago over 95 per cent (actually 96.2 per cent) were rejected, strongly endorsing the work of the Chicago induction station and local boards. In Boston, New York and Philadelphia the rejections were confirmed in a little over 80 per cent, and in San Francisco the figure was 71.4 per cent.

As stated earlier in the comment, the rejections were confirmed, as would be expected, more often in the cases of the men examined by the induction stations than in those examined by the local boards, in the ratio of about 2 to 1 as calculated in Boston, New York and San Francisco.

(*b*) *Details of Rejection Diagnoses* (table 3).—The commonest cause for rejection in all five cities was valvular disease, that is, essentially, rheumatic heart disease. It was diagnosed in 2,476 (59.9 per cent) of the 4,131 rejected cases, or 50 per cent of the entire lot of 4,994 men. The greatest number of rheumatic heart rejectees(both absolutely and relatively) was found in the third decade of life. Negroes as well as white men were commonly affected: 63.9 per cent of the rejected white men and 63.8 per cent of the rejected Negroes in four of the five cities. Five of the 6 rejected Chinese and all 4 of the rejected Filipinos in four cities had rheumatic heart disease (table 8).

There was some variation in the incidence of rheumatic valvular disease in the different cities. This diagnosis was recorded in 415 cases (51.1 per cent) in Boston, in 676 cases (70.3 per cent) in Chicago, in 545 cases (67.4 per cent) in New York, in 569 cases (65.9 per cent) in Philadelphia and in 271 cases (39.6 per cent) in San Francisco, which showed much the lowest incidence.

The valves involved and their lesions were, as one might expect, mitral first, being diagnosed alone in 1,500 cases in the five cities (stenosis in 750 cases and regurgitation without obvious stenosis in the 750 others); aortic and mitral combined second, reported in 628 cases in these same cities; and aortic alone in 280 (stenosis in 72 and regurgitation without obvious stenosis in the 208 others) (table 5). There was, however, great individual variation in the several cities, depending doubtless in large part on the interpretation of the murmurs; thus the greatest difference was found between Boston and Philadelphia, where mitral regurgitation and stenosis without aortic valvular disease were diagnosed in 58 and 101 cases respectively in the former, and in 300 and 131 respectively in the latter; and aortic regurgitation and stenosis without mitral valvular disease were diagnosed in 53 and 18 cases respectively in the former and in but 4 and no cases respectively in the latter, although there were a number of cases of aortic stenosis combined with mitral valvular disease in Philadelphia. It would seem that the diagnosis of uncomplicated mitral valvular disease, especially regurgitation, was made much more often in Philadelphia than in Boston, whereas the order was reversed with respect to the diagnosis of uncomplicated aortic valvular disease.

A history of rheumatic fever was obtained in slightly over a fourth of all the cases of rheumatic heart disease, 28.8 per cent in four of the cities (table 6), and in nearly half of those in Boston and New York. A history of chorea was rare (1.8 per cent of the rheumatic heart cases in these same four cities).

Auricular fibrillation complicating rheumatic (mitral) valvular disease was relatively uncommon, being found in only 24 (2.5 per cent) of the 960 rheumatic cases in Boston and New York; but auricular fibrillation of nonrheumatic origin was rarer still, being noted in only 4 of the 2,000 Boston and New York cases (0.2 per cent).

Syphilis as a cause of aortic valvular disease or of aortitis, definite or suspected, was very rare, having been diagnosed by the special advisory boards in only 17 cases of the 4,131 rejected (0.4 per cent); in 5 of the 17 cases aortic regurgitation was found, in 7 aortitis without aortic regurgitation and in 5 the lesion was not specified. Seven of the 17 cases were in New York and all in Negroes (table 8); all of the 5 Chicago cases were in white men; 2 of the 3 cases in Philadelphia were in Negroes; no syphilitic cases were found in Boston, where only 23 Negroes were examined, in contrast to the 90 Negroes in New York and 207 in Philadelphia.

The second most common cause for rejection was arterial hypertension, diagnosed in 1,059 (25.6 per cent) of the 4,131 finally rejected men, or 21 per cent of the total of 4,994 men reexamined. The incidence was strikingly similar in four of the five cities, there having been 249 cases in Boston, 239 in Chicago, 200 in Philadelphia and 212 in San Francisco; why there were fewer in New York (159) is not clear. Separation into systolic, diastolic and both systolic and diastolic hypertension was not carried out universally, but as a rule the elevation of pressure involved both systolic and diastolic levels; in Boston, for example, of the 249 cases both levels were elevated in 146, the systolic alone in 80 and the diastolic alone in 23. A few men with systolic hypertension (level of systolic pressure up to 160 or 170 mm. but with diastolic pressure not over 90 mm.) were accepted for resubmission in the various cities or

were included in the borderline group in Boston; no men with diastolic hypertension were so accepted. Negroes were more often rejected than white men for hypertension; for example, 12 of the 23 Negroes (52 per cent) compared to 25 per cent for the white men reexamined in Boston; 26 per cent compared to 18 per cent in Philadelphia, and 20 per cent compared to 16 per cent in New York.

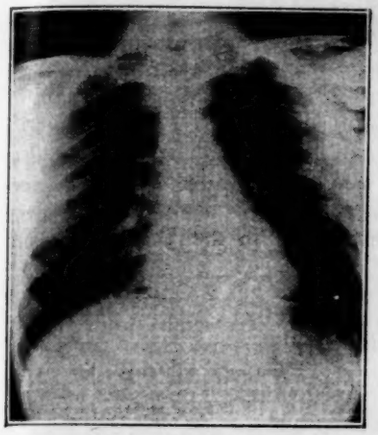

Fig. 2.—Thorax showing heart shadow beyond the normal in size according to the Hodges-Eyster calculations, based on height and weight, but apparently normal for this man's build (very wide chest). In this type of build it seems probable that the cardiothoracic ratio may be more suitable as a standard than the Hodges-Eyster figures based on height and weight (height 66 inches [167 cm.], weight 127 pounds [58 Kg.]), which, according to the Hodges-Eyster calculations, give an expected transverse diameter of 12.2 cm.; 1 cm. added to this equals 13.2 cm. The actual width of the heart is 13.8 cm. and the internal diameter of the thorax 30.5 cm. The cardiothoracic ratio = 13.8 ÷ 30.5 = 45 per cent.

All the other causes for final rejection, aside from rheumatic heart disease and hypertension, amounted to only 596 cases, or 14 per cent of the 4,131 cases finally rejected, or 12 per cent of the entire group of 4,994.

The third most common cause for final rejection was neurocirculatory asthenia, with 204 cases (4.9 per cent of those finally rejected, or 4.0 per cent of the total of 4,994 cases). The numbers varied from the maximum of 78 in Boston to the minimum of 11 in Chicago; there were 31 in New York, 54 in Philadelphia and 30 in San Francisco, where an additional group of 6 men were rejected for cardiac neurosis; 5 men in Boston were also rejected for cardiac neurosis. Negroes were rarely affected, there being only 3 so diagnosed in four of the five cities out of 174 cases rejected for that condition and out of a total of 340 Negroes rejected (table 8). The diagnosis requires an evaluation of symptoms rather than signs, and doubtless for that reason more correction was required in the case of neurocirculatory asthenia than for other diagnoses. There was a tendency to overdiagnose it originally when there was apparently only tachycardia, or to underdiagnose a far more important fundamental condition as tachycardia.

The fourth most common cause for final rejection, and probably the most debatable of all, was simple tachycardia diagnosed in 189 cases, or 4.6 per cent of the 4F cases and 3.8 per cent of the entire group of 4,994 men. It ranged in incidence, in the rejected group, from a high of 75 cases in Chicago to a low of 8 cases in Philadelphia; there were 32 in Boston, 48 in New York and 26 in San Francisco. A number of cases (27) of slight "nervous" tachycardia with rates of over 100 and up to 120, and nothing else abnormal, were put in the "borderline" group in Boston.

The fifth most common cause for final rejection was congenital heart disease (table 7) with 183, equaling 4.4 per cent of the 4F cases and 3.7 per cent of the total of 4,994. The incidence varied from the highest (63 cases) in San Francisco to the lowest (18 cases) in Philadelphia; there were 45 in Boston, 28 in Chicago, and 29 in New York. Over a third of all the cases (73) were diagnosed as ventricular septal defect (Roger's disease). The second most common lesion was patency of the ductus arteriosus with 29 cases, the third was pulmonic stenosis (15 cases, 2 of which were diagnosed specifically the tetralogy of Fallot), the fourth, coarctation of the aorta (14 cases), the fifth auricular septal defect (6 cases), and the sixth subaortic stenosis (5 cases). Four men were thought to have both patent ductus arteriosus and ventricular septal defect. One man with dextrocardia, hypertension and cardiac enlargement was rejected in New York; another with simple dextrocardia was passed as 1A in Boston. In a number of instances no specific defects could be identified but congenital heart disease seemed undoubted.

No other cause for final rejection besides the five mentioned totaled as many as 100 men. Cardiac enlargement alone that was unexplained and discovered usually only by x-ray film amounted to 76 cases, ranging from 26 in San Francisco to 9 in Chicago and Philadelphia, in which city 36 other instances of "x-ray enlargement" according to the Hodges-Eyster standard, were considered after careful study to be normal hearts. Twenty men were rejected on this basis alone in New York. Several such dubious but probably normal cases (10) were put into the "borderline" group in Boston, and comments by the examiners in San Francisco, where the highest number was rejected, expressed dissatisfaction with the criteria. (See figures 2 to 5 for illustrative x-ray examples.)

Arrhythmia was the cause for final rejection in 32 cases (less than 1 per cent) throughout the five cities, including 17 instances of paroxysmal tachycardia, 6 of uncomplicated auricular fibrillation, 2 of flutter and 5 of auriculoventricular heart block. Ten cases were diagnosed bundle branch block by electrocardiogram.

Electrocardiographic abnormalities alone were the cause for rejection in another 32 cases, with evidently a considerable variation in the interpretation of moot or borderline findings in the various cities, as shown in the tables. This variation is further evidence revealing the need for more adequate knowledge than any one possesses at present of the range of the normal electrocardiogram. (See figures 6 to 9 for illustrative electrocardiograms.)

Cardiovascular (aortic) syphilis was diagnosed in only 17 cases (0.4 per cent) of those finally rejected. This condition has already been taken up following the discussion of rheumatic heart disease above.

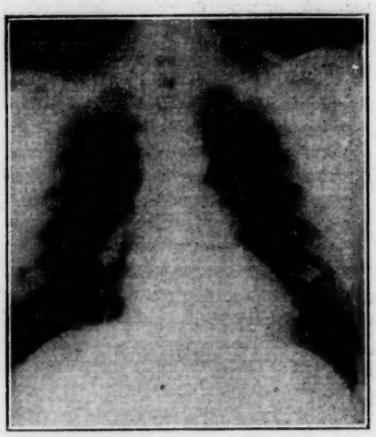

Fig. 3.—Thorax of a fat man (weight 222½ pounds [101 Kg.], height 68 inches [173 cm.] without coat, shirt or shoes). This film shows a large triangle of fat at the pericardiodiaphragmatic angle, which increases the heart shadow by at least 2.5 cm. and perhaps more, leaving the transverse diameter of the heart 15.5 cm., which is well within the normal limits both by the Hodges-Eyster tables and by the cardiothoracic ratio.

Thyrotoxicosis as a cause of tachycardia or of other symptoms and signs was diagnosed in 14 cases, recent rheumatic fever (that is, authenticated attacks within the last five years) in 13 cases, cardiac strain from chest deformities in 10, coronary heart disease in only 6 (with a record of myocardial

infarction in 3 of them), pericarditis in 4, peripheral vascular defects in only 3 cases and unspecified heart disease in 113 more.

(*c*) *Changes in Diagnosis in the Finally Rejected Group* (table 9).—Not only were the original diagnoses changed in the case of the men resubmitted for military service, but not infrequently the reexamination resulted in a relabeling of the diagnoses in the case of the men whose rejection was confirmed. The majority of the changes were quite unimportant, consisting simply of the addition of data to diagnoses already adequate for rejection, for example, "mitral stenosis" to the simple diagnosis of "rheumatic heart disease" or "aortic regurgitation" to the correct but incomplete diagnosis of "mitral valvular disease." On occasion, however, important corrections were made as in the case of the diagnosis of "heart disease" changed to "neurocirculatory asthenia," "neurocirculatory asthenia" changed to "tachycardia," "rheumatic heart disease" to "congenital heart disease" or "hypertension" or vice versa, "mitral regurgitation" to "aortic stenosis," "pericardial effusion" to "markedly enlarged rheumatic heart" and "patency of the ductus arteriosus" to "ventricular septal defect." The most common disagreement universally was in the diagnosis of rheumatic heart disease, the next in that of hypertension, the third in that of tachycardia and the fourth in that of neurocirculatory asthenia. Without doubt the greater amount of time and the quieter environment aided as much or more in the correction of diagnosis as did the greater experience of the specialists themselves. Furthermore, it should be stated that the changes in diagnosis were sometimes only provisional or questionable and that the specialists themselves were in a quandary about at least a few of the diagnoses, especially congenital heart disease.

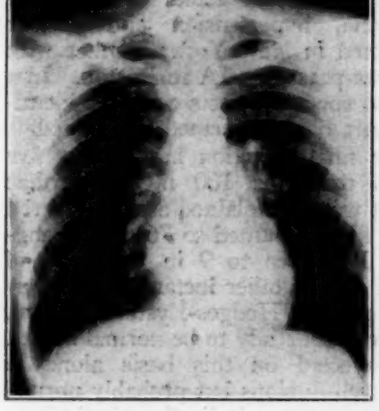

Fig. 4.—Normal heart, vertical in position, with prominence of the pulmonary arc and hilus shadows, giving a straight left upper border of the heart shadow. This contour of the left upper border of the heart shadow, sometimes in more exaggerated degree, may simulate the so-called mitral shape but is due to the position of the heart. Transverse diameter of the heart = 13.0 cm. Expected transverse diameter by Hodges-Eyster calculations = 12.8 cm. at a height of 68 inches (173 cm.) and a weight of 145¼ pounds (66 Kg.).

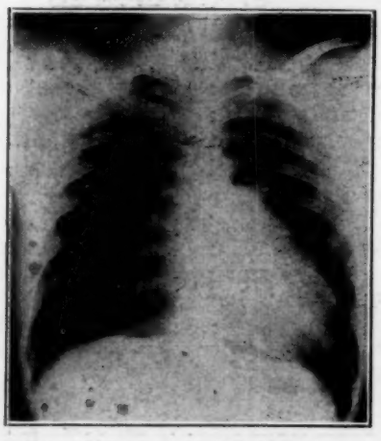

Fig. 5.—Thorax showing the shadow of the heart displaced considerably to the left by depression of the sternum. The right border cannot definitely be made out and doubtless underlies the sternum. No evidence of heart disease was found in this person.

7. *Race* (table 8).—In the early part of the discussion under section 3, Men Reexamined, mention was made of the higher incidence of the confirmed rejection of Negroes, Chinese and Filipinos than of white men. In four of the five cities all 6 Chinese and all 4 Filipinos were again rejected and 340 (88 per cent) of the 386 Negroes. Cardiovascular syphilis had a far higher, and hypertension a somewhat higher, incidence among the Negroes than among the white men, rheumatic heart disease about the same, and neurocirculatory asthenia a much lower incidence.

8. *Status in Civilian Life of Men Whose Rejection Was Confirmed.*—It was the general rule to find that the men reexamined who showed heart disease, hypertension or other cardiovascular abnormalities were engaged in occupations suited to their conditions and exposed to adequate medical advice by private physicians or hospital clinics. Rarely was it found necessary to urge a visit to a doctor or to suggest any change in occupation or therapy. The advice to "carry on" was the order of the day. Almost all the men were engaged in useful occupations despite their heart trouble, but the majority expressed a strong desire to be accepted for military service; very few were unable to work at all.

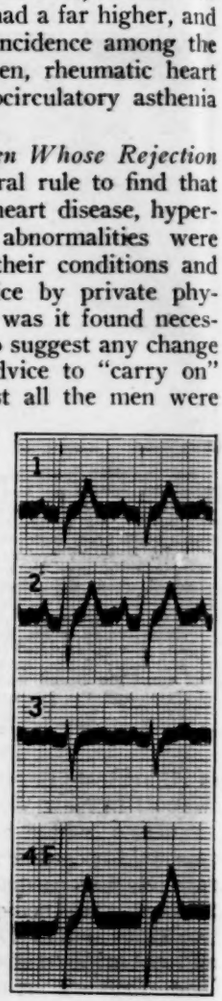

Fig. 6.—White man aged 22. No rheumatic history. Said to have had murmur since the age of 6. Examination showed inconstant systolic blow at apex. X-ray examination revealed no enlargement of the heart. An electrocardiogram disclosed incomplete bundle branch block with QRS of 0.12 second. Was not resubmitted.

9. *Problems.*—There were eight outstanding problems in cardiovascular examination for military service revealed by this study. They will be discussed in the order of their frequency and importance.

(*a*) *Systolic Murmurs at the Cardiac Apex.*—These were commonly found both in health and in disease according to the opinion of the special examining boards in all five cities. It was generally agreed that very slight to slight systolic murmurs at the cardiac apex, little or not at all transmitted to the axilla, especially if late in timing and in the absence of any evidence of cardiac enlargement, diastolic murmurs, or a history of rheumatic fever, should be considered as within the normal range, particularly if they varied greatly, sometimes to the point of disappearance, with change in body position or respiratory phase. However, there lacked complete agreement, not only between the different cities but also between the examiners in any given city, both as to the intensity of the murmurs and as to their significance. A follow-up study of the cases that were resubmitted despite the presence of apical systolic murmurs and of the Boston "borderline" group should prove of great importance in a final appraisal of such murmurs. All moderately loud or loud apical systolic murmurs were uniformly a cause for rejection.

The importance of other heart murmurs was less difficult to assess. Aortic systolic murmurs of slight degree, comparable to those acceptable at the apex, were few in number, the louder murmurs being indicative of aortic stenosis in nearly every case. Slight left lower

sternal border murmurs of uncertain origin were also few in number. Pulmonary systolic murmurs were almost universal in the supine position and on expiration, and only when they were loud and persistent were they a cause for rejection. Extracardiac scratchy to and fro murmurs varying greatly with respiration were occasionally encountered in normal persons, and an interesting "normal" variation was the extra sound in systole, the "systolic click," which had at times been a cause for original rejection.

(*b*) *Blood Pressure Levels.*—A close second to the problem of the apical systolic murmur was that of the upper levels of the normal blood pressure. Although in general the present limits as given in MR 1-9 of 150 mm. for the systolic and 90 mm. for the diastolic are satisfactory for the majority of young men at rest, there may be exceptions, and an unusually nervous or excited person can conceivably have a normal systolic blood pressure up to 160 or even 170 mm. under the conditions of the examination and perhaps a diastolic blood pressure up to 95 mm., although that is more doubtful. A relatively high pulse pressure was not uncommon in the reexamination, especially when the subject had recently taken a good deal of liquor. The more obviously nervous, mild hypertension was attended as a rule by a nervous tachycardia. Elevation of the blood pressure with a heart rate of average or low frequency is probably more serious. A follow-up study of these particular borderline cases should yield valuable information.

(*c*) *Heart Rate.*—The heart rate was considered much less of a problem by the special advisory boards in the five cities than were the apical systolic murmur and the blood pressure or, in fact, than it was apparently considered by the local boards and induction stations. The figure of 100 per minute was the criterion followed in most instances, but it has been the general opinion of all the five groups that heart rates of 110 or indeed even 120 should be acceptable, under the conditions of the examination, if there is no evidence of heart disease, febrile illness, thyrotoxicosis or other physical ailment responsible for the tachycardia, or of other rejectable conditions, such as neurocirculatory asthenia, for example. Artificial elevation of the pulse rate by the use of drugs has probably been but little resorted to by the registrants for the draft; that was considered in this reexamination but only rarely suspected. It is known that the normal heart rate in outstanding athletes at rest or relative rest can vary from 35 to 120 per minute, and so it is evident that heart rate is one of the poorest criteria of cardiovascular fitness.

(*d*) *X-Ray and Heart Size.*—One of the most difficult cardiovascular problems of today is the determination of the normal heart size and shape by any method of examination including x-ray study, and the present investigation may yield its quota of information in the solution of this problem by careful follow-up studies, both of those who were accepted despite full heart size, that is with measurements at the upper range of size agreed on, those put into the "borderline" group because x-ray measurement alone just failed to fit the so-called normal criteria, and those who were flatly rejected because the measurement slightly exceeded the upper range agreed to. The standard for the upper normal limit used in the reexamination was 1 cm. greater than that of the transverse diameter calculated by the Hodges-Eyster formula, but it seemed to many of the examiners that this measurement was inadequate. In Boston, for example, several men were examined who seemed perfectly normal in every other way except for transverse heart diameters in the teleoroentgenogram (2 meter film) a little (up to 1 cm.) more than the upper limit set; these men tended to be of unusual stature, rather short and with wide chests and shoulders, which resulted in perfectly normal "cardiothoracic ratios" (transverse diameter of heart not over 50 per cent of the internal diameter of the thorax). It was evident that height and weight alone do not properly indicate important variations in normal body build and that no criteria as yet introduced adequately cover the range of size of the normal heart.

(*e*) *Electrocardiography.*—The same difficulty exists with respect to the electrocardiogram as in the case of the x-ray heart shadow. We do not yet know the full range of the normal, and so there were men reexamined in all the cities whose electrocardiographic

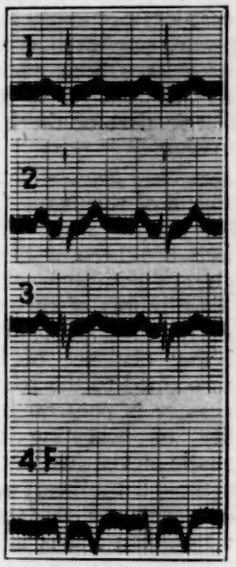

Fig. 7.—Negro aged 23. No rheumatic history. No symptoms. Systolic murmur at apex, regarded as cardiorespiratory. X-ray examination revealed no cardiac enlargement. Electrocardiogram showed sharply inverted T_4, with Q_4 of 3 mm. Final diagnosis heart disease, type unspecified. Was not resubmitted.

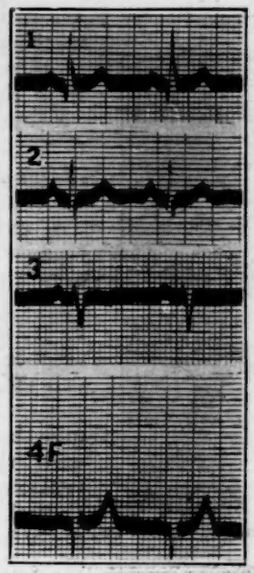

Fig. 8.—White man aged 28. History of "arthritis" when 4 years old. No cardiac symptoms. Short, faint systolic blow at apex. X-ray examination revealed no cardiac enlargement. Electrocardiogram showed large Q waves in leads 1 and 4F. Final diagnosis rheumatic valvular heart disease; mitral regurgitation. Was not resubmitted.

records were borderline. The particular problems concern the length of the PR interval (may it normally exceed 0.2 second by a little in rare cases?), the width and shape of the QRS wave (may there normally be a duration a shade over 0.1 second and is it normal to see prominent S waves in lead 2?), the level of the ST segment (may it be normally elevated by more than 1 mm. in the limb leads and 2 mm. in lead 4F?) and the shape and amplitude of the T waves (may they be flat, notched or inverted in lead 2 on occasion as well as in lead 3, especially when the heart is vertical in position?).

(*f*) *Neurocirculatory Asthenia.*—There are two problems as far as neurocirculatory asthenia is concerned: first, its recognition and, second, the acceptability of men with slight grades of the condition. We may answer the last question first by stating that there is general agreement that neurocirculatory asthenia of

moderate or pronounced degree, readily diagnosable in civilian life, is ample reason for rejection for any military service. It has been the general consensus of the reexaminers in the present study that it is wise to reject even the mildest cases, though this view is unsupported by factual evidence. The problem of the recognition of the condition is more difficult, however, especially in the milder cases. The diagnosis must perforce be made only by history of symptoms or by actual and perhaps prolonged testing and not by physical signs, such as heart rate and blood pressure, which may be well within normal limits at the time of the induction examination. The syndrome, which includes the combination of dyspnea (usually with sighing), palpitation, heartache, faintness and exhaustion on relatively little effort or excitement, is generally attended in civilian life by some definite psychoneurosis, in particular the anxiety neurosis. This fact, and also the significant report that to date, at least, in this war neurocirculatory asthenia has been found in our armed forces much less often or at least less pronounced than in the last war, suggest that many of these cases have been excluded from the service as a result of the neuropsychiatric part of the induction examination.

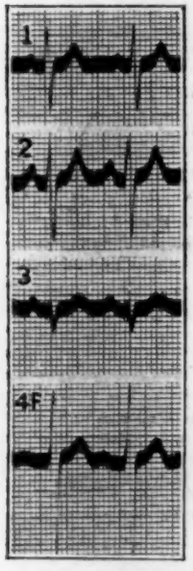

Fig. 9.—White man aged 25. History negative. No abnormal physical signs. X-ray examination revealed no cardiac enlargement. Electrocardiogram showed deep S waves. Final diagnosis no cardiovascular disease. Was resubmitted.

(*g*) *Rheumatic Fever.*—There is also the problem of rheumatic fever. To exclude registrants simply because there has been a history, even though authenticated, of one attack (or even more) of rheumatic fever in early childhood, in the absence of any evidence of heart damage, has seemed to the reexaminers unnecessary in contrast to the undesirability of accepting those with rheumatic fever within five years, even though the heart seems normal. However, as yet this is really but an opinion and is in need of verification.

(*h*) *Exercise Tests.*—One of the interesting results of this reexamination study has been the apparent neglect of exercise tests or at least of their mention as of any particular importance. To be sure, simple exercises such as hopping or a "standing run" were utilized in the search for diagnostic heart murmurs, in particular the mitral diastolic; but the general recognition that exercise tests yield information about physical fitness in general, rather than about the heart and circulation in particular, was undoubtedly the chief reason for the failure to utilize such tests during this combined study. Such testing would be more applicable, though not diagnostic, in cases of neurocirculatory asthenia, did time permit; but, in the recognition of this condition, reliance was placed largely on the history of symptoms and on neuropsychiatric examination.

SUMMARY AND CONCLUSIONS

1. An analysis has been made this year of the reexamination, by physicians trained in the study of cardiovascular diseases, of 4,994 men rejected for military service by local boards and induction stations because of the diagnosis of cardiovascular defects or neurocirculatory asthenia. The project was carried out under the auspices of the Selective Service System and with the aid of support from the Office of Scientific Research and Development. The registrants were composed of groups of approximately 1,000 men each in five cities—Boston, Chicago, New York, Philadelphia and San Francisco.

2. The chief reasons for the reexamination were to determine (*a*) the problems in cardiovascular diagnosis that particularly concern the range of the normal cardiovascular system with respect to service, (*b*) the possible salvage of men for the Army by reclassification as 1A and (*c*) the comparison of opinions of cardiovascular experts with those of the examiners at local boards and induction stations to determine the desirability of such reexaminations in this or other special medical fields throughout the country.

3. Of the total number of 4,994 cardiovascular rejectees examined, there were 863 (17.3 per cent) resubmitted as 1A and 4,131 (82.7 per cent) whose rejection as 4F was confirmed.

4. The percentage of men resubmitted as 1A was quite similar in Boston (18.8 per cent),[8] New York (19.2 per cent), and Philadelphia (16.5 per cent). In San Francisco 28.6 per cent were resubmitted.[9] Chicago yielded the lowest salvage (3.88 per cent), apparently because of the fact that cardiovascular experts had already been freely used in the decision about doubtful cases, a procedure which might profitably be followed by other examining groups throughout the country.

5. The chief cause for rejection was rheumatic heart disease, found in 2,476 men, or 50 per cent of the total 4,994, and in 59.9 per cent of the final 4F group. Mitral valvular disease without aortic valvular disease was diagnosed in the majority of these rheumatic heart cases, 1,500, or 60.6 per cent (750 with obvious stenosis), aortic valvular disease without apparent mitral valve involvement in 280, or 11.3 per cent (72 aortic stenosis and 208 aortic regurgitation alone), and mitral and aortic valvular disease combined in the remaining 628, or 25.4 per cent. Auricular fibrillation complicating mitral stenosis was found in 24 of the cases. The incidence of rheumatic heart disease varied from 70.3 per cent of the rejectees in Chicago to 39.6 per cent in San Francisco.

6. The second most common cause for final rejection was hypertension, found in 1,059 cases (25.6 per cent of the 4F cases and 21 per cent of the total series). The majority showed elevation of both systolic and diastolic levels; a few had either systolic hypertension alone or diastolic hypertension alone. The incidence varied little from city to city but was relatively more common in the fourth than in the third decade.

7. Third in frequency as a cause of rejection was neurocirculatory asthenia with 204 cases (4.0 per cent of the total series, or 4.9 per cent of those finally labeled 4F). Negroes were rarely affected. The incidence varied from 78 (8 per cent) in Boston to 11 (1.1 per cent) in Chicago.

8. The fourth condition responsible for rejection of more than 100 men was sinus tachycardia; there were 189 cases, or 3.8 per cent of the entire group and 4.6 per cent of the final 4F cases. The numbers varied from 75 in Chicago to 8 in Philadelphia.

8. Another 11.4 per cent were considered "borderline" in Boston but after special consideration were not resubmitted.

9. The men resubmitted in San Francisco included a moderate number of "borderline" cases, while in Chicago, New York, and Philadelphia the majority of "borderline" cases were rejected again.

9. The fifth most common cause for rejection was congenital heart disease, found in 183 cases (4.4 per cent of the 4F cases). The abnormality most commonly diagnosed was ventricular septal defect (Roger's disease) in more than a third of all the cases, 73. Five other defects, in the order of their frequency, were patency of the ductus arteriosus (29 cases), pulmonary stenosis (13 cases and 2 more with the tetralogy of Fallot), coarctation of the aorta (14 cases), auricular septal defect (6 cases) and subaortic stenosis (5 cases). The city incidence varied from over 6 per cent (63 cases) in San Francisco to 1.8 per cent (18 cases) in Philadelphia.

10. Other causes for rejection included cardiac enlargement alone, determined by x-ray examination (76 cases), arrhythmia in 32, including 17 cases of paroxysmal tachycardia, 6 of uncomplicated auricular fibrillation, 2 of auricular flutter and 5 of auriculoventricular block; electrocardiographic abnormalities alone in another 32 cases including 10 with bundle branch block; cardiovascular syphilis in only 17 cases, thyrotoxicosis in 14, recent rheumatic fever in 13, cardiac strain from chest deformities in 10, coronary heart disease in only 6, pericarditis in 4 and peripheral vascular defects in 3. Unspecified heart disease was diagnosed in 113 cases.

11. A history of rheumatic fever was obtained in slightly over a fourth of all the cases of rheumatic heart disease (28.8 per cent in four of the cities) and in nearly half of those in Boston and New York. A history of chorea was rare (1.8 per cent of the rheumatic heart cases in these same four cities).

12. Although the great majority reexamined were white men there were a good many Negroes (something under 10 per cent, 386 out of 4,035 examined in four of the five cities) and a few Chinese and Filipinos. There was a high rejection rate for Negroes (88 per cent) and a very high rejection rate for the Chinese and Filipinos (100 per cent) in the four cities in which racial data were available. Nine of the fifteen cases of aortic syphilis found in those cities were among Negroes, and hypertension was also more often found in the Negroes (38.5 per cent of the final 4F cases compared to 23.1 per cent for the white men). Rheumatic heart disease was evenly represented (63.8 per cent compared to 63.9 per cent), but neurocirculatory asthenia was very much less in the Negroes (0.9 per cent compared to 5.5 per cent).

13. There were eight problems of particular interest which remain unsolved and should be the focus of follow-up study but concerning which tentative opinions were expressed: (*a*) the interpretation of apical systolic murmurs (may they, if very slight or even slight, in the absence of any other abnormal or doubtful finding, be considered inadequate reason for rejection?); (*b*) the upper limits of the normal blood pressure (may the systolic pressure in very nervous young men be set perhaps as high as 160 mm. of mercury or even a shade more, provided the diastolic pressure does not exceed 90 mm.?); (*c*) the limits of the normal pulse rate at rest (may there not be a wider range, say from 40 to 120 per minute, than that actually given in the current criteria?); (*d*) the heart size, which also varies widely, especially according to body build, and may perhaps in a few normal individuals exceed the standards set by Hodges and Eyster; (*e*) the electrocardiogram, of which the wide range of normal has not yet been explored adequately; (*f*) neurocirculatory asthenia, difficult to diagnose in mild degree, but probably rejectable even when slight, unless there is an obvious cause which can be corrected; (*g*) recent rheumatic fever, a hazard even when the heart seems perfectly normal, and (*h*) exercise tests, the usefulness of which, in cardiovascular examination for military service, is open to question.

14. A follow-up study of the men reclassified as 1A and especially of the doubtful "borderline" cases in the final 4F group should, in the years to come, aid in solving some of the various problems in cardiovascular diagnosis that still remain.

15. The wisdom of extending these reexaminations for the sake of the salvage alone is doubtful in view of the time required, the few expert examiners available and the relatively small percentage of men reclassified as 1A; but the applications of the lessons learned in the course of this study should be helpful in future examinations.

Clinical Notes, Suggestions and New Instruments

A SEVERE PEMPHIGUS-LIKE REACTION FOLLOWING ADMINISTRATION OF SULFAMERAZINE

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Another sulfonamide has been released for clinical use, and a list of toxic reactions are certain to follow. Little has been reported on the toxicity of sulfamerazine. Hageman, Harford, Sobin and Ahrens[1] guardedly endorse the drug. They report drug fever and a morbilliform eruption in 2, or 1.9 per cent, of their cases. Flippin, Gefter, Domm and Clark[2] found no dermatitis in 160 cases of pneumonia treated with sulfamerazine. Gefter, Rose, Domm and Flippin[3] reported 6 cases of drug eruption in 45 cases of meningococcic meningitis. Clark, Flippin and Murphy[4] had 3 per cent toxic dermatitis, none serious. Cutaneous reactions to the sulfonamides are frequent and are usually mild; however, severe and even fatal dermatitis has been reported.[5]

We are reporting a near fatal pemphigus-like reaction to sulfamerazine after the administration of only 4 Gm. over a period of forty-eight hours.

REPORT OF CASE

J. I., a youth aged 20, white, was first treated for acute gonorrhea on Aug. 30, 1943. He was given calcium gluconate intravenously and sulfathiazole 8 Gm. daily for one week. At the end of this period the penile discharge was unchecked, and he was placed on a mild silver proteinate injection and all sulfonamides were stopped. On September 27 he was started on sulfamerazine two 0.5 Gm. tablets every twelve hours. After only eight tablets in forty-eight hours a generalized macular rash not unlike that of measles was noted; all mucous membranes were fiery red, and there were some tiny blebs in the mouth; the temperature was 102 F. September 30 he entered St. Joseph Hospital with a maculopapular eruption involving the entire body; there were many blebs in the nasopharynx; the

1. Hageman, P. O.; Harford, C. G.; Sobin, S. S., and Ahrens, R. E.: Sulfamerazine: A Clinical Study of Its Pharmacodynamics, Therapeutic Value and Toxicity, J. A. M. A. **123**: 325 (Oct. 9) 1943.
2. Flippin, H. F.; Gefter, W. I.; Domm, A. H., and Clark, J. H.: Studies on 2-Sulfanilamido-4-Methylpyrimidine (Sulfamerazine, Sulfamethyldiazine) in Man: IV. Treatment of Pneumococcic Pneumonia, Am. J. M. Sc. **206**: 216 (Aug.) 1943.
3. Gefter, W. I.; Rose, S. B.; Domm, A. H., and Flippin, H. F.: Studies on 2-Sulfanilamido-4-Methylpyrimidine (Sulfamerazine, Sulfamethyldiazine) in Man: III. Treatment of Meningococcic Meningitis, Am. J. M. Sc. **206**: 211 (Aug.) 1943.
4. Clark, J. K.; Flippin, H. F., and Murphy, F. D.: Studies on 2-Sulfanilamido-4-Methylpyrimidine in Man: II. Toxic Manifestations, Am. J. M. Sc. **205**: 846 (June) 1943.
5. Greenberg, S. I., and Messer, A. L.: Fatal Bullous Dermatitis Following Administration of Sulfamerazine, J. A. M. A. **122**: 944 (July 31) 1943. Raffetto, J. F., and Nichols, Stanley: A Nearly Fatal Reaction to Sulfadiazine in a Ten Year Old Girl, Involving Skin, Eyes and Oropharynx, J. Pediat. **20**: 753 (June) 1942.

conjunctiva was edematous and injected. In about thirty-six hours there were many bullae over the body filled with a clear straw colored fluid. There was a positive Nikolsky sign. He was delirious at times. The temperature was of a septic type, varying from 105 to 97 F. The course was septic until October 7, when he began to improve, and the temperature gradually leveled off by lysis. He was discharged on October 23 greatly improved, to convalesce at home. He still had a purulent urethral discharge, but no gonococci were found on a smear. His only sequela was conjunctival adhesions to the left eyeball, which caused no symptoms.

The patient had had pneumonia three times at ages 6, 7 and 8. No sulfonamides were used. At 9 he had mastoiditis. No sulfonamides were used. In 1942 he had purulent otitis media, which was treated successfully with sulfathiazole without reactions.

Laboratory examinations resulted in a negative Vincent smear from the mouth; blood sulfamerazine on October 2, 2.4 mg. per hundred cubic centimeters; blood culture at height of fever,

Appearance six days after onset. Note denudation. Skin is covered with zinc oxide.

negative; blood count within the accepted range of normal; urinalysis negative except for a trace of albumin and many pus cells (urethral discharge).

Treatment consisted in the intravenous administration of fluids, sedation, multiple vitamin and iron capsules by mouth, zinc oxide to the skin, boric acid packs to the eyes and phenacaine hydrochloride and ephedrine ointment to the eyes. Parenterally liver extract was administered, massive doses of vitamin B complex, ascorbic acid, menadione and vitamin D.

COMMENT

The rapid and acute onset after only 4 Gm. of sulfamerazine over a period of forty-eight hours after no toxic symptoms to sulfathiazole probably indicates some type of allergic manifestation. The skin and mucous membrane reactions were not unlike those seen in pemphigus. This was concurred in by a dermatologist and an otolaryngologist who saw him in consultation. This reaction indicates that, although sulfamerazine may prove to be an excellent therapeutic agent, it is not without dangerous sequelae.

Dermon Building.

TREATMENT OF PITYRIASIS ROSEA BY THE INJECTION OF TYPHOID VACCINE

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Pityriasis rosea is a fairly common acute self-limiting cutaneous eruption which causes no systemic symptoms. Intrinsically it is not of great importance, although it may cause uncomfortable itching in perhaps one third of the cases. However, it causes considerable worry to the patient. Its extensive distribution and unsightly appearance suggest serious possibilities. Untreated it usually heals spontaneously in four to ten weeks, leaving no sequelae. It rarely recurs.

The symmetrically disposed lesions are round or oval pinkish maculopapules which vary greatly in size and are slightly scaly. They are ordinarily easy to recognize, especially if the long axes of the ovals lie along the lines of cleavage of the body. Frequently a "herald spot" antedates the eruption by a week or ten days. The mode of spread of the eruption is as characteristic as the lesions in most cases. As Darier has said, it is "successive, progressive and descendent." Ordinarily the upper part of the trunk and the neck are first affected. The new lesions spread downward on the trunk and along the arms and centrifugally on the lower extremities. In some cases the face may be affected. The hands are almost always spared. Many clinical variants occur. In recent years it has seemed that the typical maculopapules are often accompanied by an extensive eruption of very small follicular papules, and indeed these may seem to dominate the clinical picture. Several instances of this type were included in our series. Again the lesions may be confined to the axillary folds or the groins or both with very little further extension.

The most serious error in diagnosis would be to mistake a secondary macular or maculopapular syphiloderm for pityriasis rosea. This is best avoided by remembering that secondary syphilis is a systemic disease, so search should be made for adenopathy, lesions of mucous membranes, anogenital lesions, palmar and plantar lesions and alopecia. Inquiry should be made for sore throat, hoarseness, headache and other symptoms. A doubtful eruption in a patient with positive seriologic tests is not always syphilitic but a dark field examination will usually settle the matter.

A toxic dermatosis closely simulating pityriasis rosea may occasionally follow the administration of arsphenamine, bismuth compounds or gold salts. A careful history will help identify this eruption.

The etiologic agent of pityriasis rosea is still obscure. Many facts point to an infectious agent. The disease rarely recurs in a person once affected. It seems to produce solid immunity. The number of cases seen by physicians in private practice and public clinics is definitely increased during the spring and the fall. It is true that multiple cases rarely occur in one family, but Wile,[1] working in a university community, was struck by the appearance of epidemics of the disease among students living in fraternity and sorority houses. He also was able to present experimental evidence supporting the idea of the infectious nature of the disease. By subepidermal inoculation of volunteers with artificial blister fluid from lesions of pityriasis rosea he was able to produce in 4 instances a sparse, transient generalized eruption which in some ways resembled the natural disease.

The usual methods of treatment of pityriasis rosea are palliative at best and frequently unsatisfactory. The use of ultraviolet radiation from the mercury vapor quartz lamp may shorten the course of the disease but is time consuming. On the assumption that an infectious agent was the cause of the eruption it seemed feasible to treat the disease by the intramuscular injection of typhoid vaccine in the hope that this might have a nonspecific effect in stimulating the general immune processes of the body. The work was done at the Fantus Outpatient Clinic of Cook County Hospital from March to July 1943. Standard typhoid vaccine of the type used to immunize against typhoid was used. Except in the instance of a very young child the dose used varied from 50 to 150 million killed

From the Bernard Fantus Outpatient Department, Cook County Hospital.

1. Wile, U. J.: Experimental Transmission of Pityriasis Rosea: Preliminary Report, Arch. Dermat. & Syph. **16**: 185 (Aug.) 1927.

organisms. With more experience we used the larger dose. This was administered intramuscularly in the region of the left triceps muscle by using a fine needle held perpendicular to the skin surface. Preliminary suction was made with the plunger to avoid making the injection in a vessel. Some redness and pain were complained of the night of the injection and occasionally the next morning. No systemic reactions were noted. No other treatment, local or internal, was employed.

It is doubtful whether this treatment would be effective in patients who recently had been immunized against typhoid or who had recovered from the disease. There were no such patients in our series.

After some experience with our method we made a search in the literature for reports of similar experiences. Not one was found. However, Findanza, Carrillo and Schujman [2] of Rosario University in Argentina reported the use of mixed streptococcus vaccine in the treatment of pityriasis rosea. They administered three intravenous injections every other day in ascending dosage. Twenty-two case histories were appended with results paralleling our own. The majority of the eruptions cleared in eight days.

A total of 32 patients were treated. Of these, 17, or more than half, were Negroes. The disease is apparently as common among the Negroes as among white persons as the patients coming to our clinic are not predominantly of the Negro race. There were approximately twice as many female patients as male patients. The age ranged from 4 years to 54 years. Five patients were in the first decade of life, 10 in the second and 8 in the third. Twenty-two, or 69 per cent, of the total were under 26 years of age, thus verifying the statement usually made that pityriasis rosea is a disorder of the young. In 24 instances the eruption had been noticed by the patient for one week or less, and in no case was the duration reported by the patient as longer than two weeks.

The smallest dose administered was 20 million killed typhoid bacilli, to a child of 4 years. The other children received 50 million. Patients over 13 years of age received from 100 to 150 million killed bacilli. The larger dose was adopted after more experience with the method. Observations were ordinarily made one week after treatment and at weekly intervals thereafter. Eighty per cent were followed for two weeks or longer. In 75 per cent of the cases serologic studies were made. The Kahn reaction was uniformly negative. A biopsy of a lesion was made in 4 instances with a severe eruption. The sections studied confirmed the clinical diagnosis.

At the end of the first week all lesions had completely disappeared in 4 patients, or 12.5 per cent of the total. Only faint relics persisted in 10, or 31 per cent. Involution was estimated to be 80 per cent complete in 6 others, or 18.7 per cent. Thus a total of 20 patients, or 62.6 per cent, were entirely clear or very greatly improved one week after the injection was administered. Of the remaining 12 patients improvement was estimated at approximately 50 per cent in 7, or 22 per cent. The itching, which was a disturbing feature in many instances, particularly among the Negroes, was the first symptom to respond. The eruption instead of progressively extending was not only checked but estimated to be approximately 50 per cent improved. On subsequent observation the improvement continued. In 2 instances, or 6.2 per cent, there was no improvement. In 3 others, or 9.3 per cent, the erythema had faded and the itching ceased but the lesions had not undergone involution. The response in cases with intensive eruption was frequently spectacular. A second injection may be administered one week after the first. However, since pityriasis rosea is self limiting and lasts only a few weeks, we chose in this study to limit our observations to the effect of a single injection.

SUMMARY

In the treatment of pityriasis rosea a single intramuscular injection of killed typhoid bacilli causes an abortive involution of the disease if administered early. No unpleasant reactions have been noted. A total of 32 patients were treated with greater success than we have observed with any other type of treatment.

55 East Washington Street.

2. Findanza, E. P.; Carrillo, Francis, and Schujman, Salomón: Results of Streptococcic Vaccine Therapy of Gilbert's Pityriasis, Semana méd. **43**: 1048 (April 2) 1936.

Special Article

AMERICAN HEALTH RESORTS

THE HISTORICAL BACKGROUND OF RESORT THERAPY

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These special articles on spa therapy and American health resorts were prepared under the direction of the Committee on American Health Resorts. The opinions expressed are those of the authors and do not necessarily reflect the opinion of the committee. These articles may be published later as a Handbook on Health Resorts.

Few branches of healing are more ancient than the branch of resort therapy and none, with the possible exception of surgery, has been more influenced in its display by the regard in which it has been held by the physician. Unfortunately, these views have often had little or no relation to the actual benefits of the therapy but they have nevertheless largely determined the extent to which it has been employed. Much of the discussion to follow on the historical background of resort therapy will be concerned with the forces which at different periods have raised this therapy to the central feature of medical care, have reduced it to the status of a superstition, have diverted its main features into voluptuous cultural practices, have opposed its use on the puritanical background that its measures coddled the flesh that needed scourging for the sins of disease, have degraded it to a social fad, have allowed it to pass into the hands of the charlatan and enthusiast as a panacea, have obstructed it with lack of economic provision for care and have brushed it aside with a disinterest that has come from attention fixed on only the novel in medicine. Few branches of therapy have ever suffered more, particularly in this country, from entanglements which had no relation to actual merits. Resort therapy can achieve its valid place in American medicine only when it is evaluated, not in the light of preconceived views arising from these entanglements, but solely on its basic merits.

HEALTH RESORTS OF THE PAST

The origin of health resorts, in the sense that the ill and infirm might sojourn in certain favorable localities and there have applied measures, particularly balneotherapy, to the restoration of their health, stems, in the main, as do in crude form all other great principles of therapy, from the priestly healing of pagan peoples.[1] There appear to be some exceptions to this generalization, but they are notable more by their rarity than by any general influence on the ancient origin or spread of health resort therapy. Thus among the East Indians [2] the origin appeared to have been climatic rather than religious. The ancient Sanskrit Suśruta distinguishes six seasons of the year and describes their effects on men and animals. The rainy season (Varsāh) from July 15 to September 15 was regarded

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1. Horneffer, A.: Der Priester, Jena, Diederichs, 1912, vol. 2, pp. 37-38.

2. Jolly, J.: Medizin, in Bühler, G.: Grundriss der Indo-Arischen Philologie, Strassburg, K. J. Trübner, 1901.

as the most dangerous to health and change to a dry climate was strongly recommended. But so dangerous was this time of year regarded that even in dry places it was necessary to take especial hygienic precautions. The laws of this period imposed on the king the necessity of sojourning in such a locality in this season and of applying suitable measures of hygiene. The migration in following the king was considerable; and, since bathing, massage and general care of the body were emphasized, the representatives of the healing art flocked to those places, which developed into health resorts. Unquestionably also in early but isolated instances mineral springs and the warm spring had been found by chance to give relaxation and relief from pain and so locally obtained a reputation for curative powers.[3]

In Babylon the growth, although not the origin, of health resorts was political rather than primarily religious.[4] When Hammurabi consolidated all the power of the country in the city of Babylon, other sections lost their political and commercial significance, and, to compensate for this loss, they developed the prestige of their temples until these became places of pilgrimage and health resorts.

Aside from such instances as these, the origin and growth of the health resort were probably entirely religious. Therapy centered primarily about the sacred spring or well.[5] Water was the essential purifying agent; it visibly removed the spirits which lurked in dirt and in many objects with which the body came in contact. Spirits were the cause of disease, and the lustrations of water cured disease. Drinking the water carried its virtues into the body. Often the seeker after health cast a sacrificial gift into the water as a covenant of his belief and confidence—an important feature for the psychotherapy which was inseparable from any ceremonial religious healing. Wells and springs frequently attained to special significance through unusual and mysterious properties of the water caused by high temperature, bubbling gases or mineral content which gave peculiar taste and odor.[6] Experience has shown that some of these springs have medicinal effects, but their original use probably comes less from empirical observations of these benefits than from religious ideology. It was, however, doubtless the valid benefits experienced that made this form of healing persist while other forms of religious healing tended to decay or alter. Those in search of health made pilgrimages to the healing waters; temples were built for the priests, and quarters were provided for the pilgrims during their stay. Thus it was that many sacred health resorts developed.

The religious element in the health resort of the past has been the greatest inspiration to the use of resort therapy, but it has also been an obstacle to the recognition and acceptance of the actual somatic benefits of this therapy. The patient was inspired to travel to the resort in the belief that the divine influence emanating from its waters would cure his disease. With his attention fixed wholly on the supernatural element, he was oblivious to the benefits of the salubrious location, to the rest he obtained, to the relief he found by being removed from his accustomed environment and responsibilities, to the balneotherapy he received, to the relaxing sunlight or the stimulating altitude and to the possible actual medicinal action of the mineral water. If the symptoms of his disease abated and his health improved—and these frequently occurred—it was the gods on whom his attention was centered who received the credit.

There can be little doubt that the enthusiasm engendered by the conviction of supernatural benefits was a prominent factor in many "miraculous" symptomatic recoveries. But equally there can be little doubt that many pilgrims who sojourned at the ancient wells and springs, particularly those who had chronic infections, skin diseases, arthritic and rheumatic disturbances, hypertension, gastric and nervous disorders and those who were convalescents were definitely, if less spectacularly, benefited.

These benefits were no doubt particularly obvious in the instances of city dwellers, since for them there was an especial element of rest and relaxation in the visit to the resort. Sigerist[3] attributes the growth of health resorts in part to the development of cities and the corresponding development of a definite need for periodic change of surroundings. Statements of this association of city and resort occurs frequently in older writings; thus Carey[7] in 1799, in giving his views of the curative and social advantages of various English resorts, says: ". . . they (the waters of Cheltenham) are said to relieve an aching head, clear an overcharged stomach, and promote good appetite; disorders naturally brought on by the mode of living in London."

With the rise and spread of Christianity, the pagan healing waters became Christian healing waters;[8] the curative effects were usually attributed to the endowment of a patron saint. Under Christian influence there was a tendency to minimize, or even to abolish, the physical ministrations which had played an important part in some pagan therapy and to elevate the supernatural element. Mere visit and ceremony at the well or spring were sufficient for cure; and by extension for convenience, ordinary waters of any stream or ocean were given curative powers on special occasions, as St. John's night or Easter morning.[9] Such healing has persisted, although the belief in the supernatural powers as curative forces is no longer held by the physician. Consequently to him this form of healing has become a superstition.[1] He dismisses any reputed cure as due solely to psychotherapy. But, unfortunately, the association of water at the holy well and in the health resort sometimes leads him to transfer something of his opinion from the one to the other, even though no feature of religious healing enters into the health resort. In reality, the procedures surrounding the holy healing wells are not true or complete repre-

3. Sigerist, H.: American Spas in Historical Perspective, Bull. Hist. Med. **11**: 133-147, 1942.

4. Jastrow, M.: Die Religion Babyloniens und Assyriens, Giessen, Töpelmann, 1905, vol. 1.

5. Rohde, E.: Psyche, eds. 5 and 6, Tübingen, Mohr, 1910. Oldenberg, H.: Die Religion des Veda, Stuttgart, Cotta, 1917. Wiedemann, A.: Herodot's zweites Buch, Leipzig, Teubner, 1890. Weinreich, O.: Antike Heilungswunder, Giessen, Töpelmann, 1909. Horneffer.[1] Jastrow.[4]

6. Walton, A.: The Cult of Asklepios, in Cornell Studies in Classical Philology, 1894, vol. 3. Marggraff, H.: Badewesen und Badetechnichnik der Vergangenheit, Berlin, Habel, 1881.

7. Carey, G.: The Balnea, ed. 2, London, W. West, 1799.

8. Preisigke, F.: Antikes Leben nach den ägyptischen Papyri, Leipzig, Teubner, 1916. Horneffer.[1]

9. Grimm, J. L. K.: Deutsche Mythologie, ed. 4, Berlin, F. Dümmler, 1875-1878, pp. 487-515. Wuttke, A.: Der deutsche Volksaberglaube der Gegenwart, ed. 2, Berlin, Wiegand & Grieben, 1869, p. 17. Reinsberg-Düringsfeld, O.: Das festliche Jahr, Leipzig, Spamer, 1863, p. 45.

sentatives of the principle of the health resort; they are, as indicated here, extensions of the theological but not the physiologic features of these resorts.

RELIGIOUS AND NONRELIGIOUS ELEMENTS

The rational development of the nonreligious element of ancient resort therapy was made in the classic period of medicine, which began with the time of Hippocrates. Many of the therapies passed with little change, except that of theory and ceremonies, from the religious rites of the temple to the rational recommendations of the physician. Sojourn at a special resort might be omitted—and indeed it was desirable to do so in many acute diseases—but the basic somatic therapy used at the temples became the basic therapy of the bedside.

Prior to this period, the healing of internal diseases was in the hands of the priests of Aesculapius. Surgery was not given this dignity. There was no mystery about wounds; cause and effect were obvious. Internal diseases were regarded as manifestations of the malign influence of gods and spirits, demons and heroes and hence within the domain of the priest. The temples of Aesculapius were dedicated to the care of the ill. These temples were health resorts; they were often beautiful stone buildings with shady colonnades and olive groves and great courtyards with fountains. The ruins of many exist today. The emphasis in the healing procedures was on divine intervention received during the temple sleep, but the feature important to resort therapy lay in the fact that the patients did not receive the divine aid immediately on their arrival but only after a period of preparation. While they waited with hope and enthusiasm for their day of cure they lived in inns outside the temple. As part of the preparation the patients were made to observe certain rules for physical and spiritual purification. These rules included the general therapy of a health resort: rest, sleep, diet and bathing and probably, in many instances, the use of mineral waters. The actual physical benefits of the temple treatment undoubtedly came from this regimen, which the priests had probably long since observed as an important adjuvant to the religious ceremony which climaxed the treatment.

Under the hippocratic philosophy of medicine the inherent recuperative powers of the body received their fullest and most salutary recognition—a recognition which at subsequent periods of medicine, even perhaps the modern, was too often obscured by the belief that the cure was effected by the therapy. The principle of this ancient philosophy was summed up in the famous, modest, but honest statement of Paré: "I treated him and God healed him." Under the hippocratic doctrine [10] disease was due to a disturbance in the humors of the body; the therapy was designed to assist the workings of nature, as the physician understood nature, in restoring the normal balance of the humors. The practices of the therapy were those found empirically in the long experience of priestly health resorts to be harmless and beneficial; and this basic therapy was fresh air, light, massage, balneotherapy, local application, diet, purgation and the relaxation of a quiet and restful environment.

Within this classic period there is a notable example of the sensible separation of theory and practice which, particularly in relation to the history of resort therapy, bears repetition here. Often, in the history of medicine, therapy has been developed solely on a theory, and, with each shift of theory, therapy has altered even to the extent of complete reversal. The instance here, to the contrary, is that from the school of Asclepiades of Bithynia (128 B. C.) under which the theories of causation were entirely opposed to those of the hippocratic.[10] Disease was viewed not as a disturbance of the humors but as a constriction and relaxation of its solid particles, the doctrine of *strictum et laxum*, which was subsequently revived as the brunonian theory of sthenic and asthenic states and Hoffman's theory of tonic and atonic conditions. Under the Asclepiadean doctrine nature was not to be assisted but systematically interfered with. This theory, however, did not in this fortunate instance in any way alter the therapy used; it was the same as that of the hippocratic school, a therapy which, on the basis of centuries of empirical observation, was found to yield the greatest curative benefit of any therapy then available.

The classic therapy, whatever the theory which dictated it, did not give spectacular results; the measures used were commonplace, they were often slow in operation and they were frequently time consuming for the physician. In subsequent periods, when theory became the dictator of therapy, it was often found easier by the physician, and more impressive to the patient, to prescribe a medicine or order a purge and bleeding than to nurse back health by the simple but tedious methods of classic therapy. And, as we look back, it is clear that many of the highly vaunted medicines probably had less actual virtues than the religious element of the ancient health resort and that the clyster and phlebotomy knife were more often than not true obstructions to the recovery of health. It was only the inherent recuperative powers which allowed many of the patients to survive in spite of the remedy.

The classic therapy of assisting nature is today, although not exploited as such, the basis for all therapy when better and more specific methods have not been developed. This fact gives the ancient therapies an almost negative position in the continual search for more aggressive methods; they are not looked on as curative and hence are not given the emphasis or used with the enthusiasm and perseverance that existed when no other methods were available. The search for the novel, the specific, which in certain diseases, but certain ones only, has yielded the spectacular results of some modern therapies, has so attracted attention that we are prone to forget that for many diseases—and of consequence often chronic diseases—there are no better therapies than those of the classic period of two thousand years ago. Hippocrates had successes with only the means at his hands. Likewise there seems to be a tendency in modern medicine, even though it may not be explicitly expressed, toward the Asclepiadean theory of interference with nature, a theory which in the past has given some of the most undesirable therapies in the history of medical practice. There is an inclination to view the success of surgery and of specific medications as an interference with the course of disease while in reality the surgery and the medication may operate more often, as Hippocrates saw them, by removing obstructions to the free display of the inherent healing power of the body.

10. Garrison, Fielding: An Introduction to the History of Medicine, ed. 4, Philadelphia, W. B. Saunders Company, 1929.

EMPIRICAL NATURE OF RESORT THERAPY

Resort therapy has had no striking and accepted theory to explain its benefits. Little modern investigation has been inspired to find any basis for its benefits. They are essentially empirical—as empirical as the most commonly employed, most unspectacular but most widely beneficial therapeutic measure of all modern medicine: rest in bed. They are as empirical in their benefits as is sleep. The scientifically trained physician is inclined to belittle—and often justifiably so as experience has shown—therapies that have only empirical basis. And yet many of the most ancient of resort therapies have been important rediscoveries of modern medicine and as such have had no firmer basis than the observation that the patient benefited; among these, to mention only a few, are the ice pack, the cold or hot application for inflammation, infection and sprains, the use of cold water both externally and internally in fever and in insolation and the use of continuous sedative warm baths for certain psychotic manifestations. The last use was commented on most favorably by Smollett [11] in the eighteenth century, but the theory he postulated would seemingly discourage any physician from using the practice today: "the use of it [the warm bath] is nothing more successful, than in *maniac* disorders, whether the melancholy or frantic species: both these are owing to a disordered circulation in the brain, occasioned by a thick foul viscosity in the juices, which, by a nervous constriction of the lower parts, are forcibly driven upwards, yielding an impure and interrupted secretion of the animal spirits, and disturbing their containing vessels, so as to create various *Chimaeras* in the imagination." The explanation of the manic depressive psychosis is perhaps no more satisfactory today, but the empirical benefits of the bath have fortunately survived.

From the development of alchemy and particularly the works of Paracelsus, great virtue was attached to the mineral content of medicinal waters. The application of crude chemical analysis was exploited in the hope of determining the basis of their virtues, but by the eighteenth century it led instead to the opposite result. It cast doubt on the medicinal virtues by finding in many famous waters no more mineral ingredients—and of no more peculiar nature—than in some city water supplies. This finding may be a bona fide condemnation of mineral waters in general, but equally it may be an expression of the inadequacy of chemical analysis. It was not by chemical analysis that vitamins were discovered in foods; the chemical analysis for their assay was developed only after their presence was postulated by biologic experimentation; and the findings of the biologic experimentation can now be seen, with the clarity of hindsight, to be writ large in the medical experience and domestic experience of the past. On this feature Sigerist,[3] urging the promotion of laboratory and clinical experimentation on balneotherapy, says "Chemistry until recently was gross chemistry: microchemistry is in its infancy still and we are beginning to realize that a few molecules of a chemical compound can cause definite biological reactions. The theory of dissociation and the discovery of radioactivity greatly stimulated the study of medicinal springs and Baudisch [12] has pointed out how important and illuminating Alfred Werner's concept of coordinated valence (co-valence) is in this particular field." The recent discovery of the considerable effects on the teeth of minute traces of fluorine in drinking water is also suggestive.

Smollett,[11] previously quoted on the use of the warm baths in the manic state, had an especially pertinent comment on the relation of chemical analysis and healing virtue. He said "Such diversity of opinion, among those who have laid themselves out for *analyzing* Mineral Waters, cannot fail to perplex and embarrass people who attempt to reason upon the use of them, without having had the advantage of seeing their effects, in a long course of practice, by which alone their Medicinal Virtues are to be ascertained."

In ancient as in modern times the balneotherapy consisted both in the internal use of medicinal waters and in the external application at a great range of temperatures and in a great variety of methods: the immersion bath, local application, douching and the vapor bath. Hippocrates writes of warm springs impregnated with copper, silver, gold, sulfur, and bitumen and niter. Aristotle, Strabo, Theopompus, Archigenes, each in turn, has commented on the virtues of mineral waters. Galen eulogizes certain of them for treatment of the gravel, and Vitruvius and Seneca, Celsus and others of the general period detail the use of various waters for different complaints, especially those of the stomach and liver, the skin (sulfurous waters for scabies) and for rheumatism. Pliny, with his flair for classification, treats the mineral waters in much the same manner as the chemists of the eighteenth century, but without the aid of their analytical methods, as acidulous, sulfurous, saline, nitrous, aluminous, ferruginous and bituminous.[13]

Most of the ancient writers on mineral waters, including Hippocrates, warned against their use as common beverages. In line with the disappointing discoveries from chemical analysis in later centuries has been the fact that many famous mineral waters with reputed curative powers have become widely used table waters with no indication of either ill effect or, what is more pertinent, any exuberance of health in the users who were normal. Again, as with chemical analysis, this cannot be taken by the openminded as refutation of long empirical observations. It proves only one fact, nothing more nor less: that a healthy person is not made appreciably more healthy by their use. It is likewise true that a healthy man does not become healthier and his blood redder when he takes an excess of vitamins and iron, but this fact does not prove that the debilitated and anemic show an equal lack of benefit on taking them.

These statements, and those concerning chemical analysis, are made here not because the author knows of any laboratory evidence which proves the benefits of mineral waters but to present in more fairness than is sometimes shown by the physicians of this country the situation with regard to the medicinal waters. Regard in these respects is definitely a part of the

11. Smollett, cited by Jones, C. E.: "Essay on External Use of Water" by Tobias Smollett, Bull. Inst. Hist. Med. **3**: 31-82, 1935.

12. Baudisch, Oskar: Magic and Science of Natural Healing Waters, J. Chem. Educ. **16**: 442, 1936.

13. Patissier, P.: Manuel des eaux minérales de la France, Paris, Méquignon-Marvis, 1818. Martin, A.: Deutsches Badeleben in vergangenen Tagen, Jena, E. Diederichs, 1906. Marcuse, J.: Bäder und Badewesen in Vergangenheit und Gegenwart, Stuttgart, Enke, 1903. Sudhoff, K.: Aus dem antiken Badewesen, Berlin, Allg. med. Verlagsanstalt, 1910. Negrier, P.: Les bains à travers les âges, Paris, Librarie de la construction moderne, 1925.

historical background of resort therapy since, as stated at the beginning of this article, it has been regard rather than demonstrable facts of scientific investigation for or against such therapy which has influenced its use and consequently its historical situation. On the one hand, there is a paucity of substantiated scientific evidence to support a consistent claim for the healing virtue of mineral waters, other than that some waters are laxative and many influence gastric motility [14] and circulation presumably because of their content of carbon dioxide; on the other, there is more than two thousand years of empirical observation. While waiting for a determined scientific investigation which will give indisputable proof, or disproof, the attitude of the medical scientist can properly only be that of open-mindedness. Such investigation as suggested will probably not be instituted, however, until the medical profession at large develops a far greater interest in many of the chronic, disabling but not incapacitating diseases and their distressing symptoms than is at present widely evident.

RESORT THERAPY IN ENGLAND AND AMERICA

Among the Greeks and Romans the balneotherapy of the ancient temples was developed into a cultural practice of esthetics, luxury and hygiene. Wherever the Romans settled in their conquests, the bath became a central feature of the civilization which they imposed on the conquered. In Rome the skill of the greatest architects and engineers was devoted to the development of famous baths, both public and private. The public baths were open to all classes for an insignificant fee; they were often great clubs with libraries and lounges. The bath itself was formalized as a ceremony and became a central feature in daily life, so much so that it constituted part of the demonstration of public rejoicing equal with other spectacles and, like them, was prohibited as a sign of mourning when the country suffered any calamity. In the Mohammedan countries of later date the vapor bath with plunge, massage and rest achieved as important a position in daily life if not as great a one in national affairs.

The extensive use of bathing in the Mediterranean and Eastern countries is in contrast to its little use in England and America in the eighteenth and nineteenth centuries.[15] A warm bath in the latter countries was an impressive ceremony not to be undertaken lightly. In both countries there was generally a great timidity about wetting the skin and a considerable fear that dire results would follow from immersing the body. Taking the waters at Bath or a similar resort, at the basin or under the pump, or timidly entering the sea water in a bathing machine had a distinctly daring quality that needed the support of a physician's advice. It was Count Rumford [16] who at Harrowgate carried out the hazardous experiment of taking a warm bath every day for thirty-five consecutive days, staying each time for a half hour in water at 96 F. Instead of suffering from the dire consequences that were predicted, he found instead ". . . a better appetite for my dinner . . . a better digestion and better spirits, and was stronger to endure fatigue, and less susceptible to cold in the afternoon and evening."

A more detrimental influence than fear of bodily cleanliness militated against the health resorts of both England and America. It was the overdevelopment of the social features of the resort. Many became fashionable watering places far more than health resorts; it was the paying guest rather than the ailing guest who received attention. This feature was often clearly indicated in the descriptions of the English resorts, such as that of Carey [7] in the eighteenth century, who, in describing the charms of Margate, complained that it was hard to hear the actors at the theatrical performances held in the evening because of the "noise produced from the multiplicity of dice boxes which were generally rattled at the theatre hour."

In the early days of New England the sojourn at a health resort was a conception that was entirely incompatible with the puritanical idea of rigorous discipline of the flesh. At the time of the Revolution, however, there was, as Thoms [17] has indicated, a developing interest in such resorts. In the more southern part of the United States health resort therapy was taken seriously. Bell [16] has given an excellent description of the early resorts of this country. In time, however, the social rather than the medical feature became predominant and many of the resorts which had played host to ailing men and women became centers of sporting activities with a wealthy and far from ill clientele.

This social feature, with the highly important one of economics, has done much to hamper the development of health resorts in the United States. The economic feature is fully discussed by Sigerist [3] in his article, previously cited, "American Spas in Historical Perspective." Most of the European resorts made full provisions for patients of humble means; many of these resorts, as also Saratoga and Hot Springs National Park in this country, are not privately owned but publicly. Sigerist describes the Russian system of supporting the resorts as a particularly advantageous one and the reader is referred to his article for full discussion of this important feature.

Social and economic factors were no doubt discouraging influences in determining the attitude of the American physician toward resort therapy, but equally so were the extravagant claims that many of these resorts made as to the efficacy of their cures. When the supernatural element was the inspirational feature of resort therapy, many spectacular symptomatic recoveries could be expected among psychoneurotic and hysterical patients; the blind would see and the paralytic would walk. But even these recoveries were exceeded by those claims for some of the resorts of the nineteenth century which were privately owned and operated by enthusiasts or charlatans; malaria, consumption, syphilis and cancer were, according to the literature of these establishments, cured with the same ease and certainty as by the "patent medicines" of the period, and the cure was supported by the same evidence, that of testimonials of the patients.

In contrast to these misconceptions and misrepresentations, which have done much to discredit resort therapy in this country, it is refreshing to turn to the

14. Binet, M., and Lebon, H.: De l'influence du bicarbonate de soude sur la durée de l'évacuation stomacale, Clinique, Paris **7**: 241-243, 1912.

15. S. Mohomed, author of The Bath (London 1843), although possibly prejudiced since he was the owner of a bathing establishment, comments pungently on the lack of ordinary bodily cleanliness of the Englishmen of his times.

16. Bell, J.: On Baths and Mineral Waters, Philadelphia, H. H. Porter, 1831.

17. Editorial, Connecticut M. J. **7**: 107, 1934.

old records of some of the English resorts and classify the cures which were attested by the attending physicians. The inadequacy of diagnoses is more than compensated for by the lack of any supernatural attributes and of any blatant advertising, and by the sincere support of the medical profession of the period. Thomas Guidott,[18] physician at Bath in the late seventeenth and early eighteenth centuries, records some two hundred cures from the register of Bath for that period. No record is given of the total number of individuals treated or the number of failures, although the presumption is that the latter was high since many of those coming for treatment undoubtedly had incurable diseases of long standing and were sent by their physicians to Bath as a last hope or for relief of some symptom. Such temporary relief was not recorded in the register, although the implication in the writing is that it was frequent. There could not, of course, at that period be any record of amelioration of hypertension or any other disturbance requiring instrumental detection. In somewhat over a hundred of the cures recorded, sufficient indications are given of the nature of the disease to permit tabulation, and this tabulation

Nature of Diseases Most Frequently Benefited at Bath

Disease	Per Cent
"Old aches" and persistent pains including those from old traumatic injuries	20
Rheumatism, lumbago, sciatica ("hip gout") and gout	19
Skin diseases, including fistulas and ulcers	14
Palsy	13
Gastrointestinal, urinary and liver disturbances	10
Weakness	10
Lameness	8
Paralysis	6

is given here solely to indicate the nature of the disease which the physician of the time found to be most frequently benefited.

Even at Bath at this period some of the patients who obtained relief were unquestionably suffering only from psychoneuroses. Likewise it is probable that some of the disturbances would have cleared up without any treatment. It is possible that these factors may have operated in a fair proportion of the palsies, lameness and paralyses, which constituted some 27 per cent of the cures. It is improbable that they would play an important part in the "old aches" and pains, the rheumatisms and skin diseases which constituted 53 per cent of the cures. In many instances the statement is made in the "register" that the pain or disease had been present for long periods before treatment at Bath and that in the instance of the pains and rheumatic disturbances the amelioration of the symptoms occurred soon after the treatment was started and continued with slow but progressive improvement. In a few instances there are reports on the satisfactory condition of the patient for months or even years after the cure. It is gratifying to notice that no cures are claimed for consumption, although improvement is noted.

On the continent of Europe, resort therapy had a long and dignified history; it was supported by the medical profession and its principles were taught in the medical schools. Many Americans in the last and present centuries went to these spas and it is estimated that, in 1930, 100,000 Americans took treatment in European spas, spending some $100,000,000.[19]

Interest in the French mineral waters is said[20] to have been revived for a brief time by Charlemagne, who had a bath constructed for the use of his family at Aix la Chapelle. A more persistent and more definitely medical interest arose near the end of the fifteenth century, especially in Italy. In 1489 Savonarola of Padua wrote what may be the first medical treatise on baths; he dealt mainly with the thermal waters of Italy. Bell,[16] in commenting on this serious interest, makes a statement which could be applied to a later period when, in this country, resort therapy did not receive the wide or serious support of the physician; he says: "Until then [the late fifteenth century] the mineral springs were the rendezvous of gamesters and provincial buffoons; and the superintendency of the waters was left to quacks, who readily imposed on blind and superstitious credulity." Henry IV of France is said to have corrected these abuses by an edict, later confirmed by Louis XIV, XV and XVI, from which superintendents were charged with the control over the use of mineral waters, baths and fountains of the kingdom; subsequently resident physicians were appointed by the government. Most of the European spas have been maintained under a modification of this general system, which has done much to prevent their abuse and to maintain a high scientific interest. The system has carried with it provision for the treatment of the poor and those of moderate means.

BALNEOTHERAPY AND RESORT THERAPY

While balneotherapy has been emphasized in the discussion here as a central feature of resort therapy it is nevertheless, as pointed out earlier, only one of the features; the rest, relaxation, relief from responsibility, change of environment, diet and climate each plays its beneficial part. On the ancient bathing establishment at Bejae on the gulf of Naples where the emperors came for "cure" is the inscription "Qui curat non curatur." Some of the balneologic features which at one time were exclusively those of the resort have been, as likewise indicated earlier, taken over in the treatment of diseases of a nature not treated at the resort. The use of the cold pack, bath and douche, first studied in typhoid by James Currie in the eighteenth century, employed by Cullen and put on a firm basis by Ernest Brand in 1861, serves as an instance of this progeneration; and in this instance the offspring had advantages not so liberally shared by the parent. Most of the conditions for which resort therapy is used cannot be subjected to the same positive diagnostic evaluation or direct measurement as can those, such as typhoid, which are acute and for which the thermometer often serves as an index of change in severity and mortality statistics as a prompt and convincing index of the success of therapy. Until investigation yields equally exact indexes for the diseases to which resort therapy is suited, this therapy will be forced to share some of the disadvantages of the diseases for which two thousand years and more of observation have indicated that it is beneficially applicable.

18. Guidott, Thomas: Treatise Relating to the City and Waters of Bath, London, J. Leake, 1725.

19. Beazell, W.: Report on the Spas of the Eastern United States, Report of the Saratoga Springs Commission to the Legislature, No. 70, Albany, N. Y., 1930.

20. References given in footnotes 13 and 16.

Council on Pharmacy and Chemistry

AT ITS ANNUAL MEETING IN 1942 THE COUNCIL ON PHARMACY AND CHEMISTRY DECLARED CONTRACEPTIVES ELIGIBLE FOR CONSIDERATION ON THE SAME BASIS AS THERAPEUTIC AGENTS. PRIOR TO THIS TIME THE COUNCIL'S CONSIDERATION OF THE CONTRACEPTIVE PROBLEM HAD CONSISTED IN SPONSORING WITH THE COUNCIL ON PHYSICAL THERAPY OCCASIONAL STATUS REPORTS. TO AID THE COUNCIL IN ITS CONSIDERATIONS, AN ADVISORY COMMITTEE CONSISTING OF OUTSTANDING AUTHORITIES IN THIS FIELD WAS FORMED AND IT PREPARED A SET OF CRITERIA SO THAT CONTRACEPTIVE AGENTS MIGHT BE EVALUATED CONSISTENTLY AND FAIRLY. AT FIRST THE COUNCIL ON PHARMACY AND CHEMISTRY WAS PREPARED TO CONSIDER CHEMICAL AGENTS SUCH AS JELLIES AND CREAMS AND PHYSICAL DEVICES, SINCE THE LATTER ARE OFTEN PART OF THE CONTRACEPTIVE PACKAGE AVAILABLE ON THE MARKET. LATER THE COUNCIL ON PHYSICAL THERAPY VOTED TO COOPERATE WITH THE COUNCIL ON PHARMACY AND CHEMISTRY BY RECEIVING FOR CONSIDERATION AND INVESTIGATION PRODUCTS RECOMMENDED FOR CONTRACEPTION (APPLIANCES BUT NOT DRUGS) AND BY REVIEWING DATA OR OTHER EVIDENCE SUBMITTED BY THE FIRMS OR BY ORGANIZATIONS, EITHER SUBSTANTIATING OF REFUTING THE EFFICACY OF THESE PRODUCTS. BY THE TIME THE LATTER DECISION HAD BEEN MADE, THE COUNCIL ON PHARMACY AND CHEMISTRY HAD REVIEWED THE STATUS OF APPLIANCES SUBMITTED BY TWO FIRMS BUT VOTED TO REFER ALL OTHER SUBMISSIONS OF APPLIANCES TO THE COUNCIL ON PHYSICAL THERAPY. THUS THERE FOLLOWS ON THESE PAGES A DESCRIPTION OF CERTAIN PHYSICAL DEVICES WHICH RECEIVED EARLY CONSIDERATION BY THE COUNCIL ON PHARMACY AND CHEMISTRY.

THE COUNCIL HAS ALSO AUTHORIZED PUBLICATION OF THE FOLLOWING STATUS REPORT BY DR. ROBERT L. DICKINSON, STATEMENT OF ACTIONS AND USES FOR NEW AND NONOFFICIAL REMEDIES AND CRITERIA ON WHICH SUCH CONTRACEPTIVE AGENTS HAVE BEEN EXAMINED. AS POINTED OUT, THESE CRITERIA MAY BE CHANGED AS EXPERIENCE GROWS.

AUSTIN E. SMITH, M.D., Secretary.

CONCEPTION CONTROL

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Medicine is beginning to assume responsibility for marriage counsel, for fostering desirable fertility, for prescribing protection against unwise or hazardous pregnancy, for providing sex instruction to further enduring marriage. The ability to give advice on bearing all the children compatible with well-being of parents, progeny and community calls for knowledge of the best methods of spacing births. Twenty years of experience in clinics, urban and rural, has been studied and summarized.[1] Basic research for better means is well started. There is demand for ways of protection covering a longer or shorter continuous span, as well as for those suited to the very poor out of reach of medical attention. Harmlessness, simplicity and low cost are counted as essentials. Preferred means are those in the hands of the partner most concerned, the wife.

There are two methods outstanding and equal in degree of protection. These are the diaphragm combined with jelly and the condom. For permanent prevention of pregnancy vasectomy and salpingectomy are increasingly utilized, the latter sometimes immediately after delivery. No single method encompasses all the variants in preference and in unusual conditions. The male may resort to the condom, withdrawal, closure of the spermatic ducts; the female to the fitted diaphragm with jelly or cream, the cervix cap, jelly or cream alone, douche, suppository, sterile or safe period and closure of the fallopian tubes.

Openmindedness in prescribing contraceptives is in order. Whatever method has yielded efficacy, satisfaction and a sense of well-being to a given couple should be endorsed but may be accompanied by an offer of an alternative. As an example, diaphragm-jelly appeared effective enough for prescription to the exclusion of all other methods, but long years of follow-up observation have shown a large number of couples sufficiently dissatisfied to return to their earlier procedures.

DIAPHRAGMS AND CAPS

Of the two kinds of cover for the cervix, the smaller depends on retention by suction, preferably to the fornices around the projecting portio. The other provides a partition in the vagina, the upper or anterior pocket holding the cervix, the lower or posterior part providing the channel for the penis. High protection rate depends not a little on the doctor's skill in fitting, as in all office gynecology; doctors outside this specialty (and often within it) need a brief teaching in a birth control clinic, particularly in order to cope with the difficult cases. The diaphragm is unsuited to much damaged or relaxed pelvic floors or to the short (infantile) forms of anterior vaginal wall, all of these preventing the front rim of the device being held well up to the pubic arch. An obese woman with short fingers cannot reach in far enough. There may be objections of psychologic origin.

Bimanual and speculum examinations precede measurement, selection and fitting. The size of diaphragms most used is 75 (diameter in millimeters), the range from 50 to 105. The size chosen should be as large as is comfortable. The woman examines the device after the doctor has placed it and removes and replaces it. She must learn to recognize the cervix both covered and defectively protected, and appreciate the correct subpubic location of the anterior rim. Sometimes a long thumb may guide the farther rim past the cervix, or the compressed oval can slide to one side of the cervix. Postures such as sitting on the edge of a chair or squatting may help. For premarital fitting the patient may be instructed about gradual self stretching of the hymen up to the passage of her two fingers, which diameter permits placement yet remains within the limits of anatomic virginity. A mechanical inserter or introducer has some advocates, as it imposes an oval form on the spring during introduction, readily pushes the far rim past the cervix and minimizes intravaginal finger contacts for those who object to such contact. The diaphragm is fully lubricated with a contraceptive jelly for introduction, plus a near teaspoon in the fold that goes up against the cervix, whether one's preference is with the device used cupwise or domewise. Leaving the diaphragm in place six or eight hours after ejaculation obviates the need of a douche. If removed soon after coitus, part of the douche precedes taking out and part follows, with due care to distend fully the vaginal passage. A condition improper for the circular device is cystocele, for which the forms called Matrisalus or Duraflex (resembling a reversed Smith-Hodge pessary) lift the sagging front wall up behind the symphysis. Short anterior walls and very conical cervices are indications for caps or condoms.

The rubber caps that fit more or less snugly around the cervix are the French, Prorace (Stopes) and the Mizpah, the Dumas being of intermediate size and with suction action. The hard caps are metal or plastic, best with a thickened rim. These hard caps may be worn for one night, for days at a time or continuously between periods. They are said to afford a definite degree of protection against gonococcic infection of the cervical canal.[2] Prolonged wear requires healthy organs in women who can manipulate the device and individuals who can be trusted to report often enough during test-

1. Dickinson, R. L.: Techniques of Conception Control, Baltimore, Williams & Wilkins Company, 1943; Control of Conception, Baltimore, Williams & Wilkins Company, 1938.

2. Pinkus, Felix, professor of dermatology, Frederik-Wilhelm Institute, Berlin: Fertility in Woman, personal communication to the author.

ing to be sure irritation is not caused and who will make their own observations on fluid retained and its odor, and clean the interior as often as indicated. Hard caps have for decades greatly outsold diaphragms in Germany.

As the diaphragm cannot be sperm tight at the contact circle with the vaginal walls, spermicidal jelly or cream is a necessary adjunct.

TAMPONS AND SPONGES

A wad of wool or cotton or a fine meshed rubber or marine sponge is the carrier of a chemical and is provided with a thread for removal. The contraceptive is jelly, cream or powder. When powder is used the sponge is first moistened, then dusted, then squeezed to produce foam before its insertion. These protectives are used by persons out of reach of physicians.

JELLIES AND CREAM

Contraceptive jelly is the general term for the semifluid preparations made for deposit in the upper vagina, and it includes creams or pastes. The objectives of using such agents are two, blockade of the opening into the cervical canal by adequate viscosity and paralysis of spermatozoa by a spermicide of high efficiency. The average amount used is 1 teaspoon (5 cc.) injected through a nozzle screwed onto the supply tube after taking off its cap, or drawn into a slender tube syringe that fills from a supply tube. Dosage is regulated by a turnkey on the end of this tube or by the size of the syringe. A well adjusted viscosity keeps part of the preparation in place some hours after coitus. The consistency persists for a year or more in some kinds, while in others it changes in summer temperatures or separates into solid and liquid portions. Hence dating is desirable. The vehicle should be water soluble and not sticky. The chemical must not cause local irritations or damage as do cresol preparations if concentrated and mercuric chloride. The latter, even when dilute, affects the kidneys of some patients.

SUPPOSITORIES

Suppositories possess the unique advantage of being free of apparatus but also the drawback of uncertainty of time needed for melting and spreading in the vagina and, if soluble at body heat, of running into paste in our summer temperatures. In cooler England they have long been popular and endorsed.

DOUCHES

To distend the vagina so as to open out every fold, the vulvar lips must be held together about the nozzle, then freed for each successive gush of water. This can be done by pelvic floor muscles if strong, by finger pressure, or by the conical shields on some nozzles. As sperms are rubbed during coitus into mucus on the external os and travel an inch in eight minutes, prompt action is called for, even without acceptance of the idea of "insuck" into the uterus. Among household remedies are strong soapsuds, vinegar (2 tablespoons to the half pint), alum (a level teaspoon) or lemon juice (a tablespoon to the quart). The effervescent douche directly from the neck of the bottle of the popular cheap carbonated acidulated beverages is much used and is spermicidal.

LATHERING

Immediate scrubbing of the upper vagina and cervix can be done in the squatting posture while bearing down. There is evidence that it is also of value in lessening chances of infection.[3]

3. Dixon, R. S., Detroit: Personal communication to the author.

CONDOM

The condom is the effective mechanical measure most generally available in well-to-do countries. Among commercial contraceptive articles it is by far the most frequently used. Half of those who come to birth control clinics have employed it, and it is relied on to furnish about a fourth of the protection in the United States. It stands alone as a safeguard against venereal infection. The conclusion drawn from studies of all methods shows that it deserves a much more favorable place among the physician's birth control prescriptions than is generally accorded to it. It is suited to those males with good erection and with strength of feeling tolerating some numbing, to the man taking his share of the responsibility, to the wife careful to douche promptly should it slip off as he makes exit, or in case of break. Practice often lessens objection. Easy procurability is an important factor, as well as cheapness beyond any other means when each condom is used several times. The skin condom dampens sensation much less than the rubber but is much more expensive.

Lubrication with a nonfatty contraceptive jelly inside and out is desirable. As to quality, it has been raised to a high point by federal control through the Food and Drug Administration. Therefore there is less need of test for holes by air inflation, whereby distention to about 6 by 10 inches is effected with the ring or rim held between two digits, the thicker tip distending least.

WITHDRAWAL

Coitus interrupted just before ejaculation is the contraceptive measure most extensively employed the world over. Its advantages are simplicity and availability with absence of preparation or equipment and complete local contact. The man must have trained capacity for control until his wife has full orgasm or orgasms, without undue restriction of activity and with no sequel of nerve strain for either partner. Withdrawal is not suited to males unwilling to accept limitation of gratification or for the one man in eight who has quick emission or possibly the few with some sperms in the mucus at the meatus. Medical literature shows general but by no means universal condemnation of coitus interruptus, with reported cases of nervous disorders and pelvic congestions ceasing after discontinuance. Coitus reservatus, with orgasm for the woman only, is also credited by the urologists as a cause of pathologic changes in the prostate. In France, where coitus interruptus is especially utilized by peasants and laborers, among fifty-nine prominent medical men two thirds considered it harmless or probably harmless.

LACTATION

Two thirds of babies in the United States get partial or complete breast feeding. In the first three months of suckling three out of four mothers fail to menstruate, and half the mothers will not menstruate during the entire nursing period. Ovulation and conception can occur without return of periods. Until some simple self test for ovulation is discovered, protection by mechanical or chemical measures is in order.

ABSTINENCE

The risk of psychologic disturbances and antisocial substitutes for marital coitus precludes such prescription by the physician except for limited periods or for the spiritually ascetic, the frigid wife and the impotent husband.

RHYTHM OR SAFE PERIOD

By avoidance of coitus during the few days in the monthly cycle close to ovulation, control of conception is possible. The difficulty is that there has not yet been discovered any simple means of determining the single day an ovum will receive one of the sperms, which can enter after lying in wait in the tube for about two days. Ovulation occurs about the fourteenth day before the next period is due, but the relative infrequency of regularity in menstruation makes all calculation complicated. Four fifths of all women vary five days or more in length of cycle, some eight or nine days. Latz [4] outlines this "simplest" form of direction for birth control:

"By keeping . . . records . . . preferably a year . . . of the exact dates and the hour when menstruation began . . . the cycle is determined. . . . If the variation does not exceed three or four days, twenty-six to thirty, she is ready to figure. . . . She marks the thirtieth day on the calendar, counts back eleven days, then crosses off the eight days preceding. . . . Thus the first nine days are sterile, the next eight fertile, the last eleven sterile. Next she figures on the twenty-six day possibility, counts back eleven days, then eight, and finds another figure . . . twelve days fertile, and she avoids these. . . . She will go on marking date and hour month by month thereafter and keep a written record." For each length of cycle such double calculation is needed. Any minor disturbance like a cold, a passing illness, a journey, a fright, an emotional storm, may disturb her cycle. "There is no absolute certainty, of course."

Thus about ten days preceding the period, the period itself and the few days close after it show low risk or none, but there are records of conception on every day of the cycle.

INTRAUTERINE STEMS AND RINGS

The device most commonly worn continuously was a Y shaped gold plated wire placed within the cavity of the uterus with a disk outside the cervix. This can form a ladder for infection to climb. Misfit or excessive spread of the spring sometimes cuts into the lateral or posterior wall. Rings are of fine coiled silver wire or of a single coiled silkworm strand introduced within a capsule which melts. All are generally condemned because of a few deaths and some infection,[1] but systematic follow-up is lacking either for countries with very extensive employment or for our own.

TEMPORARY IMMUNITY

Temporary immunity by hypodermic use of some constituent of semen offers as yet little hope of success. Temporary suspension of ovulation by irradiation is uncertain and involves risk of sterilization. Permanent arrest by x-rays applies only to patients with inoperable conditions, as of kidney, heart or lungs, and does not affect sex response unduly.

STERILIZATION WITHOUT UNSEXING

Closure of the spermatic ducts or the uterine tubes has been done so extensively that one can declare that it does not bring about loss of satisfaction or desire. Its application has been almost entirely to that half of the adult feeble minded who elect it in order to return to self support as the alternative to life long segregation, and sterilization qualifies many psychotic persons to leave institutions. Vasectomy is done under local anesthesia with almost no absence from work. Salpingectomy at present involves laparotomy and weeks of convalescence unless done under local anesthesia within hours or days after delivery.

4. Latz, L. J.: The Rhythm of Sterility and Fertility in Woman, ed. 6. Chicago, Latz Foundation, pp. 36, 55, 66, 106, 107.

EFFECTIVENESS AND ACCEPTABILITY

Effectiveness and acceptability are two factors in appraisal of any measure which are nearly equally involved.

Degree of protection [5] means the reduction in frequency of conception when a given method is used, as compared with frequency found in the same group in the absence of precautions. Estimates are rendered difficult by the number of variables involved, such as correctness and consistency of patient usage and deductions for illnesses, absences and infertility during child bearing and nursing. Hardest to evaluate are skill or care in technic and the invariability of use. Reports are therefore quoted from average performances. Most of them refer to underprivileged groups.

With diaphragm and jelly the degree of protection can be expected to register prevention around 90 per cent, or from 85 to 95. For white collar, manual labor and relief groups in Cincinnati, effectiveness ran to 95, 92 and 85 per cent respectively, but the poor in Puerto Rico and Tennessee secured far less protection by this means. It figured above this best in private practice in Philadelphia, or one failure in sixteen hundred times of usage.

With the condom, protection ran up to 95 per cent but sometimes was as low as 70.

Withdrawal technic offers a longer range, from 35 to 80.

Of jelly or cream alone there has been insufficient study. An average may be above 80 per cent, between 70 and 90, but the range is wide.

For foam powders on sponges the figures are 55 to 95, with rather less favorable returns as time passes.

The douche has a variant score, all the way from 16 to 70.

There are no American data on the suppository, but English returns and usage encourage research in this field.

Acceptability presents wide variants and is a factor of weight. In urban private practice in expert hands, 70 per cent were continuing the use of diaphragm and jelly at the end of three years. In birth control clinics 50 per cent carry on with this means after two years, but as few as 30 per cent even in a fine service after three years. For jelly or cream alone continuance after two years ran from 63 to 15 per cent. The return is to previously used methods, such as condom and withdrawal. For the foam-sponge and the suppository insufficient or conflicting evidence is available bearing on long continued use.

RESEARCH

Present methods of conception control are in large part beginnings, with no method accepted by all couples or to be guaranteed for all occasions. One of the most complex and difficult problems in the world, the optional defeat of that determined tendency to excess fertility which nature took millions of years to evolve and

5. If expectation is 100, for example, and the observed pregnancy rate 6, the degree of protection is here called 94 per cent. A pregnancy rate compares the number of conceptions with the number of months during which conception was possible. The latter is termed exposure to the risk of pregnancy. The expression $\frac{1,200 \times \text{conceptions}}{\text{months of exposure}}$ is the usual pregnancy rate, or the pregnancies per hundred women—years of exposure to the risk of conception. This rate is computed for specified groups of women during defined types of experience, and not for individual women.[1]

fortify—such a problem can look toward solution only when large funds back decades of systematic research on the details of the fundamentals of human reproduction.

Criteria for Acceptability of Contraceptive Jellies and Creams and of Syringe Applicators and Nozzles

For guidance in reviewing contraceptive products, the Advisory Committee on Contraceptives of the Council on Pharmacy and Chemistry has proposed the following criteria. These have been adopted by the Council but it should be emphasized that they may be changed from time to time. As the experience of the committee and the Council grows, improvements may appear desirable.

1. The use of the word "contraceptive" need not be limited to materials which will prevent conception on every occasion of use.

2. Evidence shall be furnished that use of the material decreases the incidence of pregnancy. This evidence may be secured in connection with occlusive devices unless the manufacturer's advertising is directed chiefly toward the use of the jelly or cream without such devices.

3. Evidence shall be submitted that 100 or more couples have used the material on six or more occasions without subjective injury.

4. Evidence is desirable that 12 or more women have received vaginal applications of the recommended dosage on twenty-one successive days without subjective irritation or injury and without evidence of physical damage shown by a physician's speculum examination.

5. The quantitative formula from which the contraceptive mixture is prepared shall seem to the Advisory Committee to be safe and, presumably, effective.

6. The consistency shall be satisfactory to the committee. It shall not show separation into more liquid and more solid portions visible to the naked eye.

7. Evidence is desirable that the consistency is not substantially changed after storage for twelve months at 27 C.

8. The consistency shall be reasonably uniform from batch to batch.

9. The spermicidal time of the contraceptive material as measured by the method of Brown and Gamble (Human Fertil. 5:97 [Aug.] 1940) with proportions of material, isotonic solution of sodium chloride and semen of 1:4:5 shall be thirty minutes or less as measured by the average of four or more tests.

10. The use of jellies or creams suggested by the manufacturer need not be limited to use in conjunction with an occlusive device.

11. If a syringe applicator or nozzle is furnished for use in connection with the jelly or cream, it shall be sufficiently translucent to permit the detection of air which might lead to inadequate dosage.

Criteria for Acceptability of Contraceptive Diaphragm or Cap

1. The advertising and directions of the manufacturer should make it clear that contraceptive diaphragms are intended for use in conjunction with a spermicidal jelly or cream.

2. The manufacturer's advertising must not state or imply that the appropriate diaphragm can be chosen without the aid of a physician.

3. Evidence is desirable that the diaphragm will last for twelve months or more without perforations or other defects.

4. With each diaphragm should be packed directions warning the user not to expose it to oils or greases, unless evidence is submitted that the material of which the diaphragm is made is not damaged by these substances.

5. The design shall be satisfactory to the committee.

6. The directions packed with each diaphragm shall include instructions to the user to inspect the diaphragm from time to time for holes or tears and discard the diaphragm if one is present.

(The following statement of actions and uses and descriptions will appear in N. N. R. 1944)

Contraceptive Preparations

When protection from pregnancy is considered advisable, contraceptives are used to prevent passage of active spermatozoa from the vagina into the uterus. This is accomplished mechanically by occlusive devices, such as diaphragms, which lengthen the route which the spermatozoa must travel to reach the os, thereby assuring extensive exposure to a spermicidal jelly or cream. Contraceptive jellies and creams act as chemical agents immobilizing the spermatozoa with which they come into contact. Because of their consistency they also have an obstructive function. Certain accessory devices are used with these, such as inserters and extractors for the diaphragms, and syringe applicators for the jellies and creams. In control of conception acceptability probably plays a greater role in the use and therefore the effectiveness of a prescription than in most fields of medicine. The esthetic block or reluctance toward various methods differs with different users, and variation of method by a single user is often found to lead to greater acceptability and consequently a higher degree of protection.

CONTRACEPTIVE JELLIES AND CREAMS

Actions and Uses.—Jellies and creams for contraceptive use are introduced into the vagina usually with an occlusive diaphragm or cervical cap not more than twelve hours before sexual intercourse. They may also be used without an occlusive device, but this may result in a lower degree of protection. Some users find this technic definitely more acceptable, sufficiently so to outweigh the differential in fertility rate. When so used the jelly or cream is introduced into the vagina within an hour before intercourse by a syringe applicator. The recommended dose varies but is usually approximately 5 cc. To allow adequate time for chemical immobilization, the occlusive device should not be removed nor should a douche be taken within six hours after ejaculation.

As most of the contraceptive diaphragms are made of rubber, which will deteriorate if exposed to greases, the jellies and creams used should not contain greasy substances.

Ortho-Creme. A nonfatty stearic acid cream having a p_H of 6, prepared from the formula:

Stearic acid	24.00%
Stearyl alcohol	0.50
Glycerin	7.00
Ricinoleic acid	0.75
Sodium lauryl sulfate	0.28
Boric acid	2.00
Perfume	0.05
Water to	100.00%

Actions and Uses.—See preceding article, Contraceptive Jellies and Creams.

Dosage.—5 cc.

Manufactured by Ortho Products, Inc., Linden, N. J. U. S. Patent pending under serial number 360,665 Vaginal Creams. U. S. trademark number 390,141.

Ortho-Gynol Vaginal Jelly. A water soluble jelly formed from tragacanth and acacia, having a p_H of 4.5, prepared from the formula:

Tragacanth	3
Acacia	0.5
Glycerin	5
Boric acid	3
Ricinoleic acid	0.75
Propyl ester of parahydroxybenzoic acid	0.05
Oxyquinoline sulfate	0.025
Perfume	0.025
Water to	100.00%

The consistency is indicated by a 55-60 mm. dart penetration at 40 C. when tested with the Braun dart penetrometer.

Actions and Uses.—See preceding article, Contraceptive Jellies and Creams.

Dosage.—5 cc.

Manufactured by Ortho Products, Inc., Linden, N. J. U. S. Patent number 271,159 (October 5, 1943; expires 1960). U. S. trademark number 298,222.

Contraceptive Diaphragms.

Actions and Uses.—As diaphragms cannot be designed to form a junction with vaginal wall or cervix which will prevent the passage of an organism of the size of a spermatozoon, a

spermicidal jelly or cream should be prescribed for use with them.

The appropriate size of diaphragm (varying from 50 to 105 mm. in diameter) must be chosen for each user. It should be as large as is comfortable, large enough to extend easily over the cervix, anchoring posteriorly in the posterior fornix and anteriorly behind the symphysis. The appropriate size may change after a delivery and during the postpartum months. Satisfactory fitting is not possible in some cases of variant anatomy of the soft parts (this does not refer to bony structure).

The diaphragm and jelly or cream should be inserted before intercourse (not more than twelve hours before) and left in place until six hours or more after ejaculation (not more than thirty-six hours). Rubber diaphragms should not be exposed to fatty substances and should be inspected from time to time for holes or tears.

Ortho Diaphragms. Latex rubber diaphragms covering a circular coiled spring, the external diameter varying in gradations of 5 mm. from 55 to 90 mm.

Manufactured for Ortho Products, Inc., Linden, N. J. U. S. Trademark number 387,080.

SYRINGE APPLICATORS FOR CONTRACEPTIVE JELLIES AND CREAMS

Uses.—Applicators are designed for ready filling from the container of contraceptive jelly or cream and for delivery under moderate pressure of the recommended dose (usually 5 cc.) into the upper vagina. They should be transparent, to permit detection of air which might lead to inadequate dosage, and, if made of glass, should be sufficiently thick walled to make breaking while in the vagina extremely improbable. The end should be blunt, and sufficiently large to prevent entry into the urethra.

Ortho Vaginal Applicator. A transparent plastic syringe threaded at the blunt, intravaginal end, to screw onto the tubes of Ortho-Gynol Vaginal Jelly or Ortho-Creme, to permit filling by compression of the tube. The full capacity is 5 cc., the recommended dose.

Manufactured by Ortho Products, Inc., Linden, N. J. Registration of the trademark "Ortho" for measured dose applicator was issued by the U. S. Patent Office, May 5, 1942.

Ramses Vaginal Applicator. A transparent plastic tube, threaded at the blunt intravaginal end to screw onto the tubes of Ramses Jelly to permit filling by compression of the tube. A short plastic cylinder fitting inside the tube permits air pressure from a detachable bulb to expel the jelly. The full capacity is 5 cc., the recommended dose.

Manufactured by Julius Schmid, Inc., New York. U. S. Patent number 2,252,212.

CONTRACEPTIVE DIAPHRAGM INSERTERS

Uses.—Inserters are designed to stretch the circular spring of a contraceptive diaphragm into a long oval and to furnish a handle with which it may be inserted into the vagina and guided beyond the cervix. To some users they have the esthetic appeal that they minimize digital contact with jelly or cream, or genitals.

Ramses Diaphragm Introducer. A transparent plastic device designed to stretch and hold for insertion a diaphragm of a given size. Made in different sizes marked for diaphragms from 50 to 90 mm. in diameter in gradations of 5 mm. On the handle end is a blunt hook to assist in extracting the diaphragm.

Manufactured by Julius Schmid, Inc., New York. U. S. Patent number 2,252,212, U. S. Trademark number 353,028.

CONTRACEPTIVE FITTING RINGS

Uses.—To enable the physician to test the size of contraceptive devices needed for a given patient, circular coiled springs of the various sizes have been prepared without the thin rubber diaphragm. As these have thick rubber coatings, repeated sterilization by boiling is possible without deterioration.

Ramses Fitting Rings. Prepared in sets having sizes from 50 to 90 mm. in diameter in gradations of 5 mm.

Manufactured by Julius Schmid, Inc., New York.

NEW AND NONOFFICIAL REMEDIES

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION.

AUSTIN E. SMITH, M.D., Secretary.

MENADIONE (See New and Nonofficial Remedies, 1943, p. 619).

The following dosage form has been accepted:

GEORGE A. BREON & COMPANY, INC., KANSAS CITY, MO.

Tablets Menadione: 2 mg.

THE UPJOHN COMPANY, KALAMAZOO, MICH.

Menadione (in oil) 1 mg. per cc.: 10 cc. and 50 cc. vials.

Capsules Menadione: 1 mg.

STAPHYLOCOCCUS TOXOID (See New and Nonofficial Remedies, 1943, p. 549).

The following dosage form has been accepted:

PITMAN-MOORE CO., INDIANAPOLIS

Staphylococcus Toxoid: 5 cc. vials containing in each cubic centimeter the toxoid derived from one necrotizing dose of toxin. Preserved with 1:10,000 merthiolate.

DIETHYLSTILBESTROL (See New and Nonofficial Remedies, 1943, p. 403).

The following additional dosage form has been accepted:

ELI LILLY AND COMPANY, INDIANAPOLIS

Ampules Diethylstilbestrol (in cottonseed oil), 0.25 mg. per Cc.: 1 cc.

SODIUM DEHYDROCHOLATE (See New and Nonofficial Remedies, 1943, p. 324).

The following product has been accepted:

ENDO PRODUCTS, INC., RICHMOND HILL, N. Y.

Ampoules Solution of Sodium Dehydrocholate 20% W/V: 3 cc. and 10 cc.

ESTROGENIC SUBSTANCES (See New and Nonofficial Remedies, 1943, p. 401).

The following dosage forms have been accepted:

GEORGE A. BREON & CO., INC., KANSAS CITY, MO.

Ampul Solution of Estrogenic Substances (in oil): 1 cc. and 10 cc. rubber stoppered vials. Each cubic centimeter contains 2,000 international units of estrogenic substance.

THE SMITH-DORSEY COMPANY, LINCOLN, NEB.

Ampul Solution of Estrogenic Substances (in sesame oil) with Benzyl Alcohol 3%: 1 cc. Size containing the equivalent of 2,000 I. U. per cc., 5,000 I. U. per cc. and 10,000 I. U. per cc. of estrone.

Ampul-Vial Solution of Estrogenic Substances (in sesame oil) with Benzyl Alcohol 3%: 10 cc. Each cubic centimeter contains the equivalent of 10,000 international units of estrone.

NICOTINIC ACID (See New and Nonofficial Remedies, 1943, p. 596).

The following additional dosage form has been accepted:

AMERICAN PHARMACEUTICAL CO., INC., NEW YORK

Tablets Nicotinic Acid: 50 mg.

VIOFORM (See New and Nonofficial Remedies, 1943, p. 121).

The following additional dosage form has been accepted:

CIBA PHARMACEUTICAL PRODUCTS, INC., SUMMIT, N. J.

Vioform Insufflate: 1 ounce bottles.

POSTERIOR PITUITARY INJECTION (See New and Nonofficial Remedies, 1943, p. 424).

The following dosage form has been accepted:

WILLIAM R. WARNER & CO., INC., NEW YORK

Ampuls Posterior Pituitary: 1 cc., 5 mg.

ACRIFLAVINE (See New and Nonofficial Remedies, 1943, p. 111).

The following additional dosage form has been accepted:

ABBOTT LABORATORIES, NORTH CHICAGO, ILL.

Tablets Acriflavine: 0.1 Gm.

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SATURDAY, DECEMBER 18, 1943

MOSQUITO TRANSMISSION OF ENCEPHALITIS

Successful laboratory transmission of St. Louis encephalitis virus by several species of mosquitoes has been accomplished by Hammon and Reeves,[1] of the Hooper Foundation, University of California. They have demonstrated also a symptom free viral septicemia in domestic fowls as an essential prerequisite for transmission by the mosquito.

During the summer of 1941 a study was made of the possible role of arthropods in the annually recurring epidemics and epizootics of encephalitis in the Yakima Valley, Washington.[2] About 50 human cases and an equal number of equine cases occur each year in this valley. Over 15,000 living arthropods were collected and identified in this survey. These included 12,500 mosquitoes of four different genera and about 3,000 domestic flies, black flies, ticks, mites, gnats, horse and deer flies, bedbugs and other insects. These were immediately frozen and transported by air express to the central laboratory in San Francisco. Pools of from 75 to 100 arthropods of the same species were thoroughly ground and emulsified in 30 per cent sheep serum-salt solution. The resulting emulsions were centrifuged free from visible particles and most bacteria, and the clear supernatant fluid was inoculated intracerebrally into 21 day old Swiss mice.

Inoculations showed that eight mosquito pools contained either the St. Louis or the western equine encephalitis virus in infectious concentration. All the positive emulsions were from Culex tarsalis, and virus was not isolated from other species of mosquitoes or from other arthropods. It was estimated that 1 out of every 286 C. tarsalis mosquitoes caught during this period was a carrier of encephalitis virus. Final identification of the virus was made by specific neutralization tests.

This survey was supplemented by a study of the serums of wild and domestic animals in the same region and in neighboring noninfected areas.[3] By means of specific neutralization tests 576 serums representing seventy-four animal species were examined. Approximately 50 per cent of the serums from domestic fowls (chickens, ducks, geese, pigeons, turkeys) would neutralize one or both strains of encephalitis virus. Among the wild birds of the valley only about 20 per cent were positive. Thirty-five per cent of the serums of domestic mammals were positive, contrasted with 8 per cent positive among the wild mammals of the same region. The conclusion was drawn that domestic fowls probably serve as the main reservoir for the infection of mosquitoes.

Whether or not mosquitoes could play an important part in the spread of this infection would depend on their power to transfer the virus in infective doses during their subsequent feeding on wild or domestic birds or mammals. Hammon selected a strain of St. Louis encephalitis virus originally isolated from infected mosquitoes and inoculated into 4 to 8 week old chickens and ducks as the experimental animals. Preliminary tests had shown that these birds may be infected subcutaneously with minute doses of this virus. Following such inoculation the fowls rarely showed visible manifestations of disease. From twenty-four to forty-eight hours later, however, the serums of these birds became highly infectious for intracerebrally inoculated Swiss mice. The development of a viral septicemia or "viremia" in mosquito bitten fowls, rather than manifest symptoms, therefore, was taken as the criterion for successful insect transmission.

Mosquitoes of various species were then allowed to feed on chickens or ducks, forty-eight hours after experimental subcutaneous inoculation. Following this infective meal all mosquitoes were held at a temperature averaging 80 F. or above in a room of a high relative humidity simulating the usual summer conditions in the regions under investigation. During this period the mosquitoes were allowed to feed on cotton soaked with sugar water. From two to twenty days later the presumably infected mosquitoes were allowed to feed on new experimental animals. Forty-eight hours after this feeding, blood was drawn from the fowls by cardiac puncture and 0.03 cc. of the resulting serum injected intracerebrally into Swiss mice. Each fowl was again bled on the fifteenth day and its serum tested for neutralizing antibodies.

The St. Louis encephalitis virus was successfully transmitted by this technic to fowls by nine species (three genera) of mosquitoes, of which Culex tarsalis is apparently most important. Survival of the virus for more than a few days was also shown to occur in

1. Hammon, W. M., and Reeves, W. C.: Laboratory Transmission of St. Louis Encephalitis Virus by Three Genera of Mosquitoes, J. Exper. Med. **78**: 241 (Oct.) 1943.

2. Hammon, W. M.; Reeves, W. C.; Brookman, B.; Izumi, E. M., and Gjullin, C. M.: Mosquitoes and Encephalitis in the Yakima Valley, Washington, J. Infect. Dis. **70**: 263, 267, 278 (May-June) 1942.

3. Hammon, W. M.; Lundy, H. W.; Gray, J. A.; Evans, F. C.; Bang, F. B., and Izumi, E. M.: A Large Scale Serum Neutralization Survey of Certain Vertebrates as Part of an Epidemiological Study of Encephalitis of the Western Equine and St. Louis Types, J. Immunol. **44**: 75 (May) 1942.

four other species. With Culex tarsalis the power of infection develops after an extrinsic incubation period of four days and persists for at least twenty days. With Theobaldia inoranata the minimum and maximum periods were eight and twenty-two days, respectively, with Culex coronatis, eight and ten days, and with Aedes lateralis, four and eight days.

From these and other data Hammon concludes that Culex tarsalis, Culex pipiens and several less common species of mosquitoes assume a major role in the spread of encephalitis virus in our Western states. Other presumably minor methods of spread are, of course, not excluded.

THIAMINE DEFICIENCY IN HYPERTHYROIDISM

Experimental or spontaneous hyperthyroidism increases the rate of cell metabolism and thus leads to a higher requirement of essential factors involved in the breakdown and resynthesis of metabolites. Among these factors the important role of thiamine is well established. The phosphorylated form of thiamine, diphosphothiamine or cocarboxylase, serves as prosthetic group for the enzymes concerned with the oxidation, carboxylation, decarboxylation, dismutation and condensation of pyruvic acid. Pyruvic acid is an obligatory intermediary in the normal pathway of carbohydrate breakdown and probably in the interconversion of protein, fat and carbohydrate. Conditions that lead to increased cellular metabolism and therefore to increased requirements for essential factors tend obviously to produce a relative deficiency of thiamine.

In 1937, when methods became available for the determination of thiamine in the tissues, Drill [1] confirmed this concept of thiamine deficiency. The livers and kidneys of rats receiving 100 mg. of desiccated thyroid gland daily contained less thiamine than those of normal controls, even when the hyperthyroid animals were given 500 micrograms of thiamine daily in addition to the basic diet. This work was confirmed further by Peters and Rossiter,[2] who found that the cocarboxylase content of the tissues of hyperthyroid rats was intermediate between that of normal animals and that of animals frankly deficient in thiamine.

Although this relative deficiency seldom produces the complete picture observed in experimental deficiency of thiamine, it is important in the production of the variegated symptomatology of experimental and clinical hyperthyroidism. Before the isolation of thiamine, Cowgill and his group [3] observed that normal dogs fed a yeast free diet developed anorexia and loss of weight after thirty-two days, whereas thyroxine treated dogs on the same diet developed the same symptoms after only seventeen days. In both groups of animals anorexia and loss of weight could be prevented or corrected by the addition of vitamin B complex to the diet. These experiments were repeated by Sure and Buchanan [4] in 1937 with synthetic thiamine. They observed that the administration of 30 to 100 micrograms of thiamine in rats counteracted the loss of weight caused by so high a daily dose as 0.2 mg. of thyroxine. Anorexia and loss of weight are not the only symptoms in hyperthyroidism caused or accentuated by the associated thiamine deficiency. This deficiency was shown to be responsible for other common symptoms in experimental hyperthyroidism. Abelin and his associates [5] in 1930, using yeast, and Drill and Hays [6] in 1942, using synthetic thiamine, showed that these factors prevent the loss in liver glycogen produced in rats and dogs by the administration of thyroid or thyroxine. A high vitamin B diet in thyroxine treated dogs delays the appearance of liver damage as determined by the bromsulphalein test. Also the pulse rate and the temperature in experimental thyrotoxicosis are influenced by the amount of thiamine in the diet.[6]

There is a striking resemblance between some of the clinical features of hyperthyroidism and thiamine deficiency. Anorexia, diarrhea, constipation, hypochlorhydria and achlorhydria, tachycardia, enlargement of the heart, dyspnea, palpitation, edema, fatigue, muscular pains, lowered muscular strength, neurasthenia, neuritis and disturbances in carbohydrate metabolism frequently occur in both conditions. Hence the administration of a high vitamin B diet and thiamine became a common practice in many clinics devoted to the care of those with disturbances of the thyroid. Subjective improvement associated with gain in weight, increased appetite and decrease in tachycardia has been reported by Frazier and Ravdin [7] in the preoperative treatment of hyperthyroidism after the administration of 1 to 1.5 mg. of thiamine daily. Means and his group [8] have observed a similar beneficial effect of thiamine in the medical treatment of hyperthyroidism. However, definite proof for the occurrence of thiamine deficiency in hyperthyroid patients has only recently been provided by the work of Williams and his co-workers.[9] Pyruvic acid is poorly utilized in thiamine deficiency; this forms an accepted basis for the

1. Drill, A. V.: The Effect of Experimental Hyperthyroidism in the Vitamin B_1 Content of Some Rat Tissues, Am. J. Physiol. **122**: 486 (May) 1938.
2. Peters, R. A., and Rossiter, R. J.: Thyroid and Vitamin B_2, Biochem. J. **33**: 1140 (July) 1939.
3. Himwich, H. E.; Goldfarb, W., and Cowgill, G. R.: Studies in the Physiology of Vitamins; Effect of Thyroid Administration on Anorexia Characteristic of Lack of Undifferentiated Vitamin B, Am. J. Physiol. **99**: 689 (Feb.) 1932.
4. Sure, Barnett, and Buchanan, K. S.: Antithyrogenic Action of Crystalline Vitamin B_1, J. Nutrition **13**: 513 (May) 1937.
5. Abelin, I.; Knuchel, M., and Spichtin, W.: Ernährung und Schilddrüsenwirkung: über die Bedeutung der Vitamine für den Verlauf der experimentellen Hyperthyreose, Biochem. Ztschr. **228**: 189, 1930.
6. Drill, V. A., and Hays, H. W.: Studies on the Relation of the Liver Function, Pulse Rate and Temperature of Hyperthyroid Dogs to Vitamin B_1 and Yeast, Am. J. Physiol. **136**: 762 (July) 1942.
7. Frazier, W. D., and Ravdin, I. S.: The Use of Vitamin B_1 in the Preoperative Treatment of the Hyperthyroid Patient, Surgery **4**: 680 (Nov.) 1938.
8. Means, J. H.; Hertz, Saul, and Lerman, Jacob: Nutritional Factors in Graves' Disease, Ann. Int. Med. **11**: 429 (Sept.) 1937.
9. Williams, R. H.; Egana, Enrique; Robinson, Paul; Asper, S. P., and Dutoit, Charles: Alterations in Biologic Oxidation in Thyrotoxicosis: I. Thiamine Metabolism, Arch. Int. Med. **72**: 353 (Sept.) 1943.

clinical demonstration of deficiency of thiamine. Almost all of a group of 40 thyrotoxic subjects exhibited high pyruvic acid blood levels. During a period of four hours following the intravenous injection of 50 Gm. of dextrose or 5 Gm. of sodium pyruvate, the pyruvic acid which appeared in the blood was less quickly disposed of in thyrotoxic patients than in normal controls. This decreased utilization of pyruvic acid was associated with a low blood level of free and phosphorylated thiamine. Pyruvic acid utilization became normal following administration of diphosphothiamine.

As many vitamins and similar essential factors have been shown to be involved in enzyme systems governing biologic oxidations, one might expect a multiple deficiency of these factors in conditions in which prolonged increased metabolic activity is a feature, such as hyperthyroidism. That this is true was shown by Drill and Overman,[10] who demonstrated in experimental hyperthyroidism that some deficiency symptoms did not disappear completely after administration of thiamine alone but that they did disappear on addition of pantothenic acid and pyridoxine.

The importance of these observations is self evident not only for more adequate treatment of thyrotoxic patients but also for a better understanding of the mechanisms underlying the variety of disturbances associated with hyperthyroidism.

Current Comment

ASPIRATION STUDIES ON THE LIVER IN ACUTE HEPATITIS

The results of the studies of the liver in acute hepatitis or infectious jaundice by means of aspiration biopsy made by Roholm and Iversen [1] have been confirmed and the work extended by Dible, McMichael and Sherlock.[2] Biopsies of the liver were done in 56 cases of acute hepatitis including, besides the epidemic, instances of hepatitis following arsenotherapy and the injection of human serum. Differences were not apparent in the microscopic changes in the liver in the cases examined. The aspirations were made with a 2 mm. bore cannula inserted transpleurally into the right lobe of the liver. This method is not without danger from hemorrhage, especially when jaundice is present. The essential lesions in the liver were degenerative, necrotic and autolytic changes in the liver cells, especially in the centers of the lobules, with leukocytic infiltration and histiocytic proliferation in the periportal tissues. These are the basic lesions. They may be more or less limited or diffuse with loss of the lobular patterns. The process may terminate in complete restitution, in acute or subacute necrosis ("atrophy"), in mild fibrosis or in cirrhosis. There was no evidence of bile stasis from plugging of the ducts in the papilla of Vater, as claimed to be the case in "catarrhal jaundice" in the old sense. The fact that the lesions in the liver are similar in epidemic or infectious hepatitis and in hepatitis following arsenotherapy or injection of human serum or plasma does not necessarily mean a common causation for these processes. While the cause of epidemic hepatitis remains unknown, its infectious and communicable nature can hardly be questioned. The results of the Danish and British studies of biopsies of the liver appear to establish clearly the effects on the liver in epidemic hepatitis. In view of the nature of these effects and their possible consequences, special attention must be given to the prevention of the disease. Its natural spread seems to depend mainly on contact.

10. Drill, V. A., and Overman, Richard: Increased Requirement of Pantothenic Acid and Vitamin B_6 During Experimental Hyperthyroidism, Am. J. Physiol. **135**: 474 (Jan.) 1942.

1. Roholm, K., and Iversen, P.: Changes in the Liver in Acute Epidemic Hepatitis (Catarrhal Jaundice) Based on 38 Aspiration Biopsies, Acta path. et microbiol. Scandinav. **16**: 427, 1939. Problems of Infectious Jaundice, editorial, J. A. M. A. **122**: 1184 (Aug. 21) 1943.

2. Dible, J. H.; McMichael, John, and Sherlock, S. P. V.: Pathology of Acute Hepatitis: Aspiration Studies of Epidemic, Arsenotherapy and Serum Jaundice, Lancet **2**: 402 (Oct. 2) 1943.

RAPID ACCLIMATIZATION TO WORK IN HOT CLIMATES

During the winter season Robinson and his co-workers [1] at the Fatigue Laboratory of Harvard University carried out experiments in which five men walked on a motor driven treadmill from one to one and a half hours a day in a room in which desert conditions were simulated. The purpose of these observations was to determine the rate and degree of adjustment to hot climates. An artificially heated room, where the temperature was about 104 F. and the humidity 23 per cent, was employed. The men walked on a motor driven treadmill at a rate of 3½ miles an hour on a grade of 5.6 per cent (one walked on a grade of 4 per cent). During all experiments the men wore standard Army summer clothing. Pulse rates were determined by palpation, rectal temperatures by clinical thermometers and skin temperatures by four thermocouples respectively located on the chest, back, thigh and upper arm. The rate of water loss was determined by weighing in the nude before and after work. Oxygen intake was determined once for each experiment by collecting and measuring the expired air and analyzing samples in the Haldane apparatus. All but the one man who walked on the lower grade approached heat exhaustion in the early experiments, this being manifest by high skin temperatures, rectal temperatures of 103 to 104 F. and heart rates averaging 178 beats per minute during the last twenty minutes of work. The daily walks were continued for twenty-three days. The comparable heart rates of the men declined from the average of 178 at the beginning to 155 on the seventh day. The average skin temperature of the men at the end of the work experiments declined from 98.4 to 96.5 F. and of the rectal temperature from 103.4 to 101.7 F. during the same period. About 80 per cent of improvement noted was found to have occurred in the first seven days of exposure. In 3 of the 5 subjects in the study, furthermore, the efficiency in the standard hot room experiments declined only slightly as late as two to three weeks after stopping the exposure to acclimatization. It is noteworthy, the Boston investigators comment, that acclimatization

1. Robinson, S.; Turrell, E. S.; Belding, H. S., and Horvath, S. M.: Am. J. Physiol. **140**: 168 (Nov.) 1943.

occurs so rapidly, that such a short period (one to one and a half hours) of daily periods of work in the heat are needed to produce acclimatization, that adjustment to heat is retained for such a long time after exposure has ceased and that the acclimatization is so complete. These observations are of immediate practical importance to the armed forces and to industry. Men who are already in good physical condition can be expected to work effectively within a few days after they start in a hot climate, or they can be prepared for such work by a few relatively short daily exposures in artificially heated rooms. Additional experiments, these investigators point out, are needed in order to determine whether it may not be possible to achieve even more rapid acclimatization by shorter, harder, more frequent work periods in heat or by prolonging the daily periods of such work.

HYPERSENSITIVITY FROM INHALATION OF ATOMIZED FLUID ANTIGENS

Inhalations of finely atomized specific antiserum have been suggested for the prevention and treatment of influenza. A possible hazard of this experimental procedure has just been recorded by Hopps and Moulton.[1] Their report is based on tests made with five antigens (nonhomologous) on guinea pigs and rabbits. The animals were placed in a closed chamber and exposed for twenty minutes to finely atomized particles of the various serums. By the third of the three weekly exposures many mild reactions were observed. By the fifth week of such treatment allergic reactions were severe. Several of the sensitized animals died in the chamber during exposure to the atomized specific antigen. Since serious allergic reactions and fatal anaphylactic shock have occurred in animals from a procedure which has been suggested for human beings, further human studies should be pursued with great caution. Routine use of aerosols of this nature is not now desirable.

FATAL ACCIDENTS FROM "DORYL"

Deaths have recently been reported following the parenteral use of a crystalline preparation intended only for ophthalmologic use. "Doryl" (carbamylcholine chloride) is a synthetic derivative of choline, available in the form of the chloride salt as a parasympathomimetic agent. It is available as a solution in ampules for intramuscular injection and as crystals for use in preparing solutions for the eye. Because the crystals also have been marketed in ampules, errors have been made in preparing these crystals for injection rather than using the available ampule solution for intramuscular use. The deaths which followed injection were due to the fact that the concentration was several hundred times greater than it should have been. After the first death the firm's attention was drawn to the confusion existing because of two different forms in ampules. Changes apparently were made in the labeling, and the ampule containing the crystalline form was changed to a screw-cap vial, a type of package seldom if ever employed for preparations for parenteral use. In spite of these changes at least two deaths have occurred. The firm has now asked all hospital pharmacies and drug wholesalers to return for exchange all packages of Doryl substance shipped prior to Oct. 1, 1943, irrespective of whether the goods on hand are of the ampule or of the newer screw-cap vial package type. Physicians should examine carefully their own supplies to prevent further accidents.

1. Hopps, H. C. and Moulton, Stanley: Active Hypersensitivity from Inhalation of Finely Atomized Fluid Antigens, Proc. Soc. Exper. Biol. & Med., to be published.

GRADUATE CONTINUATION COURSES FOR PRACTICING PHYSICIANS

In accordance with its plan of supplying advance information concerning graduate continuation courses, the Council on Medical Education and Hospitals presents lists of such courses elsewhere in this issue. The lists include courses in a wide variety of subjects offered at some time during the period Jan. 1, 1944 to June 30, 1944. This material has proved useful to physicians seeking opportunity for postgraduate work. Physicians called on to assume new responsibilities because of the war and physicians who are returning to practice may find here listed courses which will be of help to them. Since many of the classes are necessarily limited, those who contemplate enrolling in any of these courses are urged to communicate as early as possible with the proper executive officer. Institutions offering continuation courses are invited to announce such courses in these semiannual lists compiled by the Council on Medical Education and Hospitals.

STREPTOTRICHIN—ANTIBACTERIAL SUBSTANCE FROM A SOIL FUNGUS

Many forms of actinomycytes or ray fungi, widely distributed organisms, produce antibiotic substances of varying nature and action. Of these substances streptotrichin has been found to be the least toxic and to have antibacterial powers. It is a metabolic waste product of a soil fungus (Actinomyces lavendulae) from cultures of which it can be obtained in aqueous solution.[1] Waksman and his associates have demonstrated that a salt free purified streptotrichin has selective bacteriostatic effect on gram negative as well as gram positive bacteria, including Bacterium shigae. They have shown also that streptotrichin acts on Brucella abortus in vivo,[2] in chicken embryo and in guinea pigs. In guinea pigs the effect suggested that streptotrichin might prove to be of value in the treatment of brucella infections. In view of its low toxicity and of its action in vivo on pathogenic bacteria, Waksman places streptotrichin as the fourth in order of discovery of antibiotic substances with possibilities of practical application, of which penicillin so far is the most striking example. The other two substances in this group are pyocynase and tyrothricin. Further developments in the investigation of antibiotic substances will be of great interest.

1. Waksman, S. A.: Production and Activity of Streptotrichin, J. Bact. **46**: 299 (Sept.) 1943.
2. Metzger, H. J.; Waksman, S. A., and Pugh, L. H.: In Vivo Activity of Streptotrichin Against Brucella Abortus, Proc. Soc. Exper. Biol. & Med. **51**: 251 (Nov.) 1943.

MEDICINE AND THE WAR

In this section of The Journal each week will appear official notices by the Committee on War Participation of the American Medical Association, announcements by the Surgeons General of the Army, Navy and Public Health Service, and other governmental agencies dealing with medicine and the war, and such other information and announcements as will be useful to the medical profession.

TROPICAL DISEASES IN RETURNING MILITARY PERSONNEL

[NOTE.—*The publication of this statement has been requested by the Subcommittee on Tropical Diseases of the National Research Council. The statement has the approval of the Division of Medical Sciences, National Research Council, and of the Surgeons General of the Army, Navy and Public Health Service.*—ED.]

The military forces of the United States operating in tropical and subtropical areas are exposed to a number of diseases which occur only in those areas or are much more prevalent there than in this country. Some of these diseases will be brought back to this country in returning military personnel and may be seen by civilian practitioners of medicine either in persons infected abroad or in persons to whom the diseases have spread from the original cases. It is important that physicians be familiar with the diseases which may be imported, and that they be on the alert to diagnose and treat them correctly and to prevent their spread.

MALARIA

Malaria is the most important of these diseases. In most tropical regions Falciparum malaria,[1] the severe form of the disease, predominates. Vivax malaria is also common. Malariae malaria is relatively rare, and ovale malaria is very rare. Neither quinine nor atabrine prevents malarial infection. Suppressive treatment, formerly incorrectly termed 'drug prophylaxis,' will usually prevent clinical symptoms and keep infected persons on their feet as long as they continue such treatment, but many of them come down with clinical malaria within a few weeks after stopping treatment. Such cases are more likely to be caused by Plasmodium vivax than by Plasmodium falciparum. Vivax malaria is prone to relapse several times even after supposedly adequate courses of treatment. Some military and civilian personnel, returning to this country by air, become infected while stopping in highly malarious areas en route. These persons have their first attack of malaria, usually falciparum infection, after arriving in this country. The symptoms may be obscure and the disease not suspected, and coma or even death may ensue before the diagnosis is made.

Malaria should be suspected in every person returning from the tropics or subtropics. The disease may simulate almost any acute or chronic abdominal condition, upper respiratory or pulmonary conditions, meningitis, encephalitis, coma from other causes, or primary or secondary anemia. Blood examination should be made as soon as the patient is seen, using both thin and thick smears in order to afford the best chance of finding parasites. Species identification should be made by a competent technician, and the disease should not be excluded until several blood examinations have been made at intervals of six to twelve hours. Vigorous treatment must be instituted promptly to avoid fatalities and to diminish the incidence of relapses.

It is possible that local outbreaks of malaria may occur in this country, starting from relapsing cases acquired abroad. The United States Public Health Service recognizes this possibility, is already cooperating with certain states in intensive anti-mosquito programs and is prepared to act vigorously if epidemics occur. Physicians can cooperate in avoiding such occurrences by the early diagnosis and reporting of cases, by adequate treatment and by preventing access of mosquitoes to infected patients. Attention is directed to Circular Letter 153 from the Office of the Surgeon General of the Army, dealing with the treatment of malaria. It was published in THE JOURNAL September 25, pages 205-208.

Individuals without clinical malaria but in whose blood malarial parasites are found should be treated immediately or kept under careful observation.

DYSENTERY

Bacillary dysentery is usually an acute disease but may become chronic or give rise to carriers. Although the use of sulfonamide drugs will undoubtedly diminish the probability of chronic or carrier conditions, a history of the disease in military personnel should lead the physician to keep it in mind. The cause of chronic diarrhea or any vague abdominal symptoms should be investigated bacteriologically. Transient or chronic carriers of dysentery bacilli are usually present among the contacts of cases. Cultures should be taken from cases and contacts, preferably by the rectal swab technic, and persons found positive should receive sulfonamide treatment in order to avoid the development of active symptoms or further spread of the infection.

Amebic dysentery, or amebiasis, is much more likely than bacillary dysentery to become chronic or to recur in acute or subacute episodes. It may result in liver abscess even without previous noticeable symptoms. Possibly strains of Endamoeba histolytica from the tropics are more pathogenic than those from temperate zones. The incubation period may be very long, or infections acquired in the tropics may produce no symptoms in the initial patient but may be responsible for family or community epidemics under conditions of bad sanitation or contamination of water supplies. Clinically amebiasis should be suspected in any person returned from the tropics who complains of blood in the stools, alternating diarrhea and constipation or vague abdominal symptoms. Diagnosis, however, must be made by a technician competent to differentiate Endamoeba histolytica from the other intestinal protozoa and from body cells.

1. In the interest of more accurate diagnosis and better treatment, physicians are urged to use the etiologic terminology in differentiating the four malaria infections of man as follows: falciparum malaria (instead of estivoautumnal, subtertian, malignant tertian, tropical or pernicious malaria), vivax malaria (instead of tertian or benign tertian malaria), malariae malaria (instead of quartan malaria) and ovale malaria.

FILARIASIS

Filariasis, caused by Wuchereria bancrofti, the lymphatic filarial worm of man, is prevalent in many parts of the tropics, particularly in certain islands of the Southwest Pacific. It is transmitted by a number of species of mosquitoes, the most important of which are probably Culex quinquefasciatus and Culex pipiens, the common night biting mosquitoes of both hemispheres. The incubation period of the disease is usually six months or longer, and its first manifestation is acute lymphangitis or lymphadenitis before the worms become mature and before the larvae appear in the blood. It is not known whether the lymphangitis is caused by the worms themselves or by a secondary hemolytic streptococcus infection. There is no specific treatment for the worm, but sulfonamides sometimes relieve the lymphangitis, at least temporarily.

Cases of this infection have been acquired by military personnel. In the absence of an effective chemotherapeutic agent infected individuals may be discharged from military service and have subsequent attacks of lymphangitis. Or microfilariae may be found in the blood after several months or years even without the ultimate development of elephantiasis or other obstructive manifestations. Other infected individuals may be discharged from military service during the incubation period and come under civilian medical care during their first attack of lymphangitis. The possibility of the establishment of endemic foci in this country must be kept in mind, but this is improbable because a high local incidence of infection and many mosquitoes are necessary for this to occur. The only endemic area in the United States, that around Charleston, S. C., has apparently disappeared with the improvement in mosquito control.

OTHER DISEASES

The other diseases which may possibly be brought into the continental United States by returning military personnel are visceral and cutaneous leishmaniasis, schistosomiasis, the filarial worms Loa loa and Onchocerca, African trypanosomiasis, leprosy, relapsing fever and various fungous diseases of the skin. The probability that new endemic areas of any of these diseases will become established in the United States is very slight. They should, however, be recognized clinically and etiologically by the medical profession.

RECOMMENDATIONS

It is recommended that physicians and health departments prepare themselves for the diagnosis, treatment and control of disease brought back by returning military personnel. Physicians can cooperate by providing themselves with a modern textbook on tropical medicine, by keeping these diseases in mind and by reporting them to public health authorities as soon as a diagnosis is made. State and local medical societies can aid by devoting programs to this field. Health departments can cooperate by obtaining special instruction in tropical medicine and parasitology for their laboratory personnel and epidemiologists, and by keeping local practitioners informed of new developments or hazards.

CIVILIAN DEFENSE

MANUAL ON RESCUE TECHNIC

"A Technical Manual for the Rescue Service" was recently issued by the rescue section of the medical division of the Office of Civilian Defense, Washington, D. C., in which methods of rescuing persons trapped in buildings demolished by high explosive bombs or in wreckage caused by other types of disasters are described.

The manual provides a guide for the organization of the rescue service, its operation in disaster and plans for training. It is explained that the rescue service in the U. S. Citizens Defense Corps is a specialized service primarily developed for the rescue of persons from demolished buildings in which fire is under control or no fire has occurred. Since the great conflagrations caused by incendiary bombs require the entire personnel and equipment of the fire service, firemen cannot be spared to dig into ruins for persons buried in débris, the introduction points out.

Most of the manual is devoted to a detailed presentation of actual rescue technics, describing how buildings collapse, the various stages of rescue, methods of locating casualties and how to reach them. Directions are given for clearance of débris, for trenching and tunneling through ruins of buildings and for shoring and demolition. A chapter describes the use of ladders, ropes and lashings. Other chapters present specific instructions on rescue in the presence of common gases such as utility gases, sewer gas and refrigerants, and on the special methods necessary in rescuing persons from areas in which war gases have been used.

Explicit instructions are given concerning equipment for rescue squads and for individual members of squads. There are chapters on respiratory protective equipment, lighting, gas detection and ventilating equipment and the special working equipment needed for rescue work, including oxyacetylene cutting apparatus.

Emphasis is placed on the training of rescue personnel in the emergency field care of the injured. It is pointed out that rescue workers are usually the first to reach trapped casualties and that they must know how to render essential first aid. The medical division has just issued a manual entitled "Field Care and Transportation of the Injured" (THE JOURNAL, December 4, p. 911) for the training of rescue workers, ambulance drivers and attendants, stretcher bearers and nonmedical members of mobile medical teams.

CHANGES IN STAFF OF THE MEDICAL DIVISION OFFICE OF CIVILIAN DEFENSE

Dr. Courtney M. Smith, assistant regional medical officer in the ninth civilian defense region, recently stationed in Seattle, has been promoted to be regional medical officer with headquarters in San Francisco. He succeeds Dr. Fred T. Foard, senior surgeon, U. S. Uublic Health Service, who has been made district director, U. S. Public Health Service District No. 8, with headquarters in Denver. Prior to his appointment in the medical division of the Office of Civilian Defense, Dr. Smith was assistant health commissioner of Alaska. He holds the rank of surgeon in the U. S. Public Health Service Reserve. Dr. Arthur J. Lomas, deputy state chief of Emergency Medical Service for Maryland, Baltimore, has been assigned as regional medical officer for the third civilian defense region, which includes Maryland, Pennsylvania and Virginia. Dr. Lomas succeeds Dr. Mark V. Ziegler, senior surgeon, U. S. Public Health Service, who has been assigned to the U. S. Maritime Commission. Dr. Lomas has the rank of surgeon in the U. S. Public Health Service Reserve. Dr. Benjamin F. Miller, assistant professor of medicine, University of Chicago School of Medicine, Chicago, was recently commissioned in the U. S. Public Health Service and assigned to the Washington staff of the medical division on October 1 as assistant chief of the scientific research and development section. Ward L. Mould, surgeon, U. S. Public Health Ser-

vice Reserve, who has been assigned to the staff of the medical division, Office of Civilian Defense, since September 1941, has returned to the U. S. Public Health Service. Dr. Mould served in various capacities in the medical division, most recently as medical chief of the industrial plant unit. He has been assigned temporarily as assistant to the director, U. S. Public Health District No. 1, with headquarters in New York City. Victor H. Vogel, surgeon, U. S. Public Health Service Reserve, administrative officer of the blood plasma unit of the medical division since its establishment early in 1942, has been transferred to the staff of the U. S. Public Health Service Hospital in Lexington, Ky.

ARMY

SELECTION OF CASES FOR ELECTIVE OPERATION FOR PREINDUCTION DISABILITY

Circular Letter No. 190 of the Office of the Surgeon General is concerned with the selection of cases for elective operation for preinduction disability. It was issued on November 17 to all medical officers of the United States Army and is to be substituted for S. G. O. Circular Letter No. 167 of Nov. 30, 1942. The suggestions which follow are now recommended as routine in the army medical service:

1. In order to achieve maximum utilization of manpower it is desirable to perform elective operations for the correction of preinducted disabilities, but careful consideration must be given to the selection of individuals with these defects.

2. Elective surgery should be considered only for individuals with conditions which experience has shown may be readily corrected and who thereby can be restored to full military duty within a relatively short period of time. On the other hand, operations should not be considered in individuals with defects which would require prolonged hospitalization or in which the liability of recurrence or failure is great. Some examples of these preinduction defects which should not be considered for operation are herniated nucleus pulposus, recurrent pilonidal sinus with extensive involvement and scar formation, and internal derangements of the knee except those with intact crucial and lateral ligaments, good thigh musculature and no arthritic changes. No person with a preinduction disability should be considered for an elective operation unless the person gives particular promise of being of future value to the Army both from a mental and from a physical aspect.

THE REAM GENERAL HOSPITAL

The U. S. Army took over from the Army Air Force on September 10 the Regional Station Hospital, formerly the Breakers Hotel, of Palm Beach, Fla., and on October 1 this hospital was officially designated as the Ream General Hospital. The location of the hospital is excellent for convalescent rehabilitation. It is situated directly on the Atlantic Ocean, with beach areas for games, exercise and sun bathing. There is also a large outdoor salt water swimming pool. The operating rooms, laboratories, physical therapy and other general hospital clinics are equipped with the most modern appliances. At the present time all types of cases are treated—wounds received or diseases contracted in the theater of operations. However, for the future this hospital has been designated by the Office of the Surgeon General to specialize in maxillofacial plastic surgery, ophthalmic surgery and neurosurgery.

The Ream General Hospital was named for Major William R. Ream, first flight surgeon to qualify as an airplane pilot and first flight surgeon to lose his life in a plane crash in World War I.

The medical officers on the staff at present are as follows:

Col. Charles C. Demmer, Belmont, N. Y., commanding officer.
Lieut. Col. Norman L. Cutler, Newark, Del., chief of ophthalmology section.
Lieut. Col. Charles H. Fair, Greenville, S. C., chief of surgical service.
Major Sam W. Banks, Chicago, assistant, surgical service (orthopedic).
Major Truman G. Blocker Jr., Austin, Texas, assistant, surgical service.
Major Joshua C. Drooker, Dorchester, Mass., surgical service (ENT).
Major Paul F. Fletcher, Lenay, Miss., assistant, surgical service.
Major Isadore W. Ginsburg, Linwood, Pa., assistant, medical service (cardiology).
Major Augustus McCravy, assistant, surgical service.
Major Daniel J. Preston, Wilmington, Del., assistant, surgical service.
Major Herman Selinski, New York, assistant, medical service (neuropsychiatry).
Major Herman Semenov, Beverly Hills, Calif., chief, ENT section.
Major Joseph E. Schaefer, assistant, surgical service.
Major Joseph H. Shaffer, Detroit, chief of medical service.
Capt. Thomas F. Coates Jr., Tazewell, Va., assistant, medical service.
Capt. John A. Gormly, Providence, R. I., assistant, medical service.
Capt. William W. Jack, Grand Rapids, Mich., assistant, surgical service.
Capt. Orville N. Jones, Portland, Ore., assistant, surgical service.
Capt. Stephen Kiss, Woodhaven, N. Y., assistant, medical service.
Capt. Edwin J. Medden, Seneca Falls, N. Y., assistant, surgical service.
Capt. William Serber, Philadelphia, chief of roentgenology service.
Capt. Clyde F. Smith, Philadelphia, attending surgeon.
1st Lieut. Alfred R. Berkeley Jr., Roanoke, Va., assistant, medical service.
1st Lieut. Richard W. Burger, Cokeburg, Pa., assistant, medical service.
1st Lieut. Carl E. Lischer, Webster Groves, Mo., assistant, surgical service.
1st Lieut. Anthony C. Reiger, Southeast Rapids, Mich., assistant, surgical service (physical therapy).
1st Lieut. Leonard Stone, Staten Island, N. Y., assistant medical service.
Capt. Mary A. Muldoon, A. N. C., Germantown, Pa., chief nurse.

A. M. A. EMPLOYEE AWARDED LEGION OF MERIT

Master Sergt. John A. Kovacs was a member of the staff of the Council on Pharmacy and Chemistry before going into the army. He is now serving at Headquarters in the North African Theater of Operations and was recently awarded the Legion of Merit "for exceptionally meritorious conduct in the performance of outstanding services." The official citation continues: "Sergeant Kovacs organized and administered without adequate assistance an efficient administrative system in the Office of the Surgeon, North African Theater of Operations, which was highly successful. With an infinite capacity for detail and with initiative, resourcefulness and leadership beyond all expectation, he made function the complex administration necessary for theater medical service. Throughout this entire time he maintained all required records, prepared necessary books and gathered data utilized in plans and operations for the Tunisian campaign. His outstanding devotion to duty and his superior performance materially contributed to the medical service in North Africa and set a high example for others. Entered service from Chicago, Illinois."

CHIEF OF NEUROPSYCHIATRY AT AMERICAN BASE HOSPITAL IN NORTH AFRICA

Lieut. Joseph Zimmerman, formerly of Brooklyn, has been appointed chief of neuropsychiatry at the American base hospital in North Africa. Dr. Zimmerman went to Africa with one of the first medical detachments of the Army and was assigned to headquarters in Algiers, where he has served until his most recent assignment. Dr. Zimmerman graduated from Syracuse University College of Medicine in 1936 and served his internship at the North Eastern Hospital in Philadelphia. He entered the service in December 1942.

MAJOR GEN. JOHN M. WILLIS TRANSFERRED

Major Gen. John M. Willis, who has been commanding officer at Camp Grant, Ill., since October 1941, has been transferred to command all medical and hospital services of the army throughout the Ninth Service Command, comprising the states of California, Nevada, Utah, Oregon, Washington, Idaho, Arizona and Montana. Because of the presence in that wide area of certain huge army medical establishments, the new assignment is considered to be of unusual importance. With headquarters at Fort Douglas, Utah, General Willis will have direct

supervision of such institutions as Fitzsimons General Hospital, Denver, and the Letterman General Hospital, San Francisco. General Willis graduated from George Washington University School of Medicine, Washington, D. C., in 1909 and has been a medical officer of the regular army since 1911.

EMERGENCY SURGERY OF THE EXTREMITIES

Circular Letter No. 189 of the Office of the Surgeon General is concerned with emergency surgery of the extremities. It was issued on November 17 to all medical officers of the United States Army. The suggestions which follow are therefore recommended as routine in the army medical service:

1. Compound fractures and wounds of the extremities are still being treated with closure of the wounds and without thorough débridement. On a recent inspection trip 3 patients were observed who had recently undergone guillotine amputation of the lower extremity for gas gangrene, 2 after wound closure and the third following incomplete débridement. Other patients have suffered extensive infection under similar circumstances. Compound fractures and other wounds will have débridement as soon as the patient's condition permits, and wounds will be left open with light packing. It is strictly forbidden that any compound fracture or extensive wound of the extremities be treated with closure of the wound.

2. Confusion exists relative to the principles of emergency amputation. For example, given a hypothetical case of a hopelessly damaged leg near the ankle joint, the proper treatment is neither an open (guillotine) nor a closed amputation in the middle third of the leg. The proper emergency amputation in this type of case is an open (guillotine) amputation at or immediately above the level of the injury. Amputation for trauma will be a circular open (guillotine) amputation at the lowest possible level followed by the application of skin traction. It is strictly forbidden that such amputation be done higher than necessary or that the stump be closed. (See S. G. O. Circular Letter No. 91, 26 April 1943.)

Commanding officers of all general and station hospitals will be held responsible for the abandonment of the improper procedures described above and for the necessary instruction and compliance with these directives.

PROCUREMENT AND ASSIGNMENT SERVICE FOR PHYSICIANS, DENTISTS AND VETERINARIANS

HOSPITALS NEEDING INTERNS AND RESIDENTS

The following hospitals have indicated to the Council on Medical Education and Hospitals that they have not completed their Procurement and Assignment Service quotas for Jan. 1, 1944 or later:

(Continuation of list in THE JOURNAL, December 11, p. 975)

CALIFORNIA

Barlow Sanatorium, Los Angeles. Capacity, 100; admissions, 165. Dr. Howard W. Bosworth, Medical Director (resident—tuberculosis—July).

Orthopaedic Hospital, Los Angeles. Capacity, 75; admissions, 1,876. Miss Mildred Riese, Superintendent (resident—orthopedics—October).

St. Luke's Hospital, San Francisco. Capacity, 225; admissions, 6,548. Dr. Howard H. Johnson, Medical Director (resident—medicine, surgery—July).

DELAWARE

St. Francis Hospital, Wilmington. Capacity, 137; admissions, 1,847. Sr. M. Illuminata, Superintendent (intern).

DISTRICT OF COLUMBIA

Garfield Memorial Hospital, Washington. Capacity, 452; admissions, 10,197. Dr. Francis J. Eisenman, Superintendent (residents—obstetrics, medicine, surgery—April, July).

FLORIDA

St. Luke's Hospital, Jacksonville. Capacity, 210; admissions, 6,462. Mr. W. E. Arnold, Executive Director (intern—March).

INDIANA

St. Joseph's Hospital, South Bend. Capacity, 192; admissions, 4,494. Sister Mary Ellen, Superintendent (interns—January, July).

IOWA

Broadlawns Polk County Public Hospital, Des Moines. Capacity, 49, admissions, 352. Mr. T. P. Sharpnack, Administrator (intern—March).

MARYLAND

South Baltimore General Hospital, Baltimore. Capacity, 170; admissions, 3,755. Mr. William A. Dawson, Administrator (2 interns).

MASSACHUSETTS

Boston Floating Hospital, Boston. Capacity, 50; admissions, 866. Mr. Frank E. Wing, Director (3 assistant residents—pediatrics—July).

Carney Hospital, Boston. Capacity, 268; admissions, 5,619. Sister Mary Paul, Superintendent (3 interns).

Haverhill Municipal Hospitals (Hale), Haverhill. Capacity, 198; admissions, 4,487. Mr. William W. Savage, Director (intern—March).

Malden Hospital, Malden. Capacity, 271; admissions, 4,984. Dr. Donald M. Morrill, Medical Director (resident—mixed—July).

MISSOURI

Homer G. Phillips Hospital, St. Louis. Capacity, 753; admissions, 10,686. Dr. Wallace B. Christian, Medical Superintendent (2 assistant residents—April).

NEW JERSEY

Elizabeth General Hospital and Dispensary, Elizabeth. Capacity, 250; admissions, 5,523. Mr. W. Malcolm MacLeod, Superintendent (interns—March, July).

Hospital of St. Barnabas and for Women and Children, Newark, Capacity, 252; admissions, 6,048. Mr. John G. Martin, Superintendent (intern—April, June, August, September).

St. Joseph's Hospital, Paterson. Capacity, 468; admissions, 7,835. Sister Anna Rita, R.N., Superintendent (8 interns).

Weehawken North Hudson Hospital, Weehawken. Capacity, 191; admissions, 3,549. Dr. J. Lawrence Evans, Administrator (3 interns—May).

NEW YORK

Jewish Memorial Hospital, New York City. Capacity, 217; admissions, 4,994. Mr. Louis Miller, Superintendent (intern—January, February, March, April, July).

OHIO

Toledo Hospital, Toledo. Capacity, 320; admissions, 7,236. Mr. Wilson L. Benfer, Superintendent (2 interns—February, April—resident—July).

Harding Sanitarium, Worthington. Capacity, 59; admissions, 396. Dr. George T. Harding, Medical Director (resident—Psychiatry—Grad. College Med. Evang.).

OKLAHOMA

St. John's Hospital, Tulsa. Capacity, 300; admissions, 7,800. Sister M. Rosalinda, R.N., Superintendent (3 interns—March).

PENNSYLVANIA

Hospital of the Woman's Medical College of Pennsylvania, Philadelphia. Capacity, 200; admissions, 3,532. Dr. F. S. Fetterman, Medical Director (3 interns—April).

Memorial Hospital, Philadelphia. Capacity, 118; admissions, 2,635. Mr. Harry J. Rodgers, Superintendent (intern).

St. Christopher's Hospital for Children, Philadelphia. Capacity, 82; admissions, 1,877. Miss Mabel Barr, Administrator (3 assistant residents—pediatrics—July).

SOUTH CAROLINA

Greenville General Hospital, Greenville. Capacity, 315; admissions, 7,007. Mr. J. B. Norman, Superintendent (intern).

TEXAS

All Saints Episcopal Hospital, Fort Worth. Capacity, 100; admissions, 3,230. Dr. T. C. Terrell, Medical Director (resident—mixed—July).

WEST VIRGINIA

Wheeling Hospital, Wheeling. Capacity, 236; admissions, 4,587. Sister Mary Ruth, R.N., Superintendent (2 interns—January—mixed resident—July).

WISCONSIN

Luther Hospital, Eau Claire. Capacity, 176; admissions, 3,888. Mr. N. E. Hanshus, Manager (intern).

St. Francis Hospital, LaCrosse. Capacity, 292; admissions, 5,518. Sister M. Fridoline, Superintendent (intern).

St. Mary's Hospital, Madison. Capacity, 225; admissions, 6,657. Sister M Bernadette, R.N., Superintendent (interns).

Misericordia Hospital, Milwaukee. Capacity, 183; admissions, 4,851. Sister M. Seven Dolors, Superintendent (intern—May).

MISCELLANEOUS

SOME RESTRICTIONS REMOVED ON THE MANUFACTURE AND DISTRIBUTION OF X-RAY EQUIPMENT

The War Production Board issued on November 29 Limitation Order L-206 as amended. A complete revision of the former Order L-206 (issued in October 1942) whereby controls over the manufacture and distribution of x-ray equipment are relaxed, it is designed to provide adequate equipment for civilian use without the paper work formerly required by special authorization of civilian purchase orders and by the filing of production and shipping schedules. In general, military orders are now being filled on schedule.

The chief provisions of the amended order are as follows:

1. Shipments of medical x-ray equipment for civilian use are placed on a quota basis. Annual shipments of each manufacturer are limited to 75 per cent by dollar value of the average annual shipments made during 1937, 1938 and 1939. Quotas apply only to shipments within the United States, to its possessions and territories and to Canada.

2. Medical x-ray equipment for the United States and Canadian military services and for export under lend lease and OEW (now part of the Foreign Economic Administration) is not included in the quota. Industrial x-ray equipment is also outside the quota.

3. Former restrictions on models and types of specified x-ray equipment are removed from the order through deletion of schedule A.

4. Monthly reports of shipments by dollar value are to be made by letter. Production and shipping schedules (form PD-774) and authorization applications (form PD-556) need no longer be filed.

5. Coverage of the order remains unchanged. X-ray equipment, as defined, includes only power units; radiographic, fluoroscopic and therapy tables; photofluorographic units; cassette changers, and tube stands. It does not include parts, accessories or appliances or rebuilt and second hand equipment.

PUBLIC HEALTH UNDER HITLER

In the August 28 *Transocean* the scientific correspondent Bruno Werner writes: More than 1,000 foreign medical doctors from thirty-four different states are studying in Berlin at the end of the fourth year of war. They are not medical students but fully fledged doctors, many of them famous in their home countries and several even with international reputations. They have been attracted to Berlin by German achievements in the field of medicine. Many of them are interested in the German methods of combating infant mortality, the results of which were recently published. Another field they are studying intensely is that of German methods of care for mothers in childbirth, which have practically abolished puerperal fever. Many of these foreign physicians working in Berlin were commissioned by their respective governments and are also interested in matters pertaining to youth and child welfare as well as hereditary biology. The specialists with whom I had occasion to talk expressed surprise that during the seven years from 1936 to 1943 one million more children were born in Germany than could be expected in 1933. Another fact which surprised them was that a close study of the birth rate showed that the number of German families with three children during these seven years had increased by 54 per cent and that of families with four children by as much as 62 per cent. The large influx of medical men was also caused by the development of surgical methods in Germany as a result of the war. For instance, the improvement of the electron microscope with its revolutionary results in surgery has brought to Berlin a number of specialists from France, the southeastern European countries and Scandinavia.

According to *Le Nouvelliste de Lyon* of August 25, 97 cases of poliomyelitis have till now been registered, of which 35 are in Montluçon itself and 62 in the neighboring communes belonging to the Montluçon arrondissement, namely 23 children under 6, 21 children from 6 to 13, 32 youths from 13 to 21 and 21 adults. Sixteen deaths have occurred, especially among youths and adults. Mademoiselle Possy, a medical officer and head of the Montluçon health department, immediately organized a serotherapy center at the municipal laboratory where 12 liters of blood was collected from about 60 former poliomyelitic patients: from this 4,000 centiliters of serum could be obtained. Moreover the Pasteur Institute, the Toulouse health department and Dr. Debré sent serum at the outbreak of the epidemic. Dr. Bons has opened a special ward at the Montluçon Municipal Hospital accommodating 69 patients. Two hundred and forty-six former patients answered the broadcast appeal of the Secours national, of which 148 will be sent to Paris, 31 to Lyons, 13 to Montpellier, 9 to Bordeaux and 8 to Toulouse, where blood collecting centers have been opened on lines similar to those of the Montluçon center, where 37 ex-patients will also be sent from various departments.

The Berne correspondent of *Aftontidningen* of August 23 reports that in an article entitled "Unborn Children" the German health leader, Conti, says that the population of Berlin will die out in three generations if the birth rate continues to decline as it is doing at present.

Le Petit Parisien (North Zone) of August 1 states that Parisians are complaining this year of a new kind of offensive, for which fleas and lice are responsible. This invasion is worthy of the full attention of the health authorities, for it is well known that lice are a means of spreading infection, particularly exanthematic typhus. It is true that up till now there has been no epidemic but at the most a few isolated cases. Nevertheless a strict watch must be kept, all suspects must be isolated and delousing and disinfecting posts must be set working full blast both in Paris and in the suburbs.

Suodem Sosialidemokraatti of September 19 states that two thousand foreign doctors from thirty-four different countries are now working in Berlin, some of them famous all over the world.

The September 22 *Journal officiel* published a law according to which midwives are included in the Order of Doctors. They form in each department a "college" which has corporative functions similar to those of the "college" of doctors.

According to DNB of September 23 the führer has awarded the Knight's Cross of the War Merit Cross with Swords to Prof. Dr. Handloser, chief of the army medical services, in recognition of his services in the development and operation of the medical services of the armed forces.

According to Rome Radio (home service in Italian) of September 22, in conformity with the regulations concerning the uniform of the militarized personnel of the Red Cross, officers of the Red Cross organizations, doctors and chemists are to carry revolvers in their belts. Naturally, when such personnel are ordered to go out without arms, they may retain them in their houses.

Radio Vichy of September 30 reports that the initial courses for medical students have been canceled in schools which are at present open, with the exception of the Nantes and preparatory schools. Candidates who were about to take these initial courses will be able to put their names down only for one of the following faculties: Paris, Montpellier, Nancy, Strasbourg (evacuated to Clermont), Lyons, Bordeaux, Lille, Marseilles, Toulouse and Nantes. To avoid crowding in certain faculties, the number of candidates permitted to follow these courses will be decided by the Ministry for National Education. As regards the "mixed" Faculty of Medicine and Pharmacy at Lyons, the dean invited candidates to send, before October 6, an application form in which they state in order of preference three establishments they would like to attend. In the event of their wishing to change their order of preference, every care will be taken to meet their request if possible.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

CALIFORNIA

Patent Rights Awarded to Alumni Research Foundation.—Dr. Alonzo J. Neufeld, assistant clinical professor of orthopedics, College of Medical Evangelists, Loma Linda-Los Angeles, has made a legal transfer of all his rights in the appliance of the Neufeld pin to the recently created Alumni Research Foundation of the college (THE JOURNAL, October 9, p. 364). Dr. Neufeld's one stipulation is that all monies received shall be applied to research work in the field of orthopedic surgery. Dr. Neufeld devised the Neufeld pin some years ago in the course of his clinical work. He has always kept the proceeds from the pin in a separate fund dedicated to research.

Memorial Fund for Research in Pathology.—The A. Herman Zeiler Memorial Fund will be created under a resolution adopted at a meeting of the medical executive committee of the Cedars of Lebanon Hospital, Los Angeles, November 9, in honor of the late Dr. Zeiler, who was director of the laboratories, member of the medical executive committee and chief of staff of the hospital. The fund will be established by assessment from the members of the staff of the hospital and by contributions from colleagues and friends and will be used for research in pathology under the administration of the research committee of the hospital. The resolution also provides that a portrait of Dr. Zeiler be prepared to hang in the hospital. Dr. Zeiler died July 16.

Annual Course in Ophthalmology and Otolaryngology.—The Research Study Club of Los Angeles will conduct its thirteenth annual midwinter postgraduate clinical convention in ophthalmology and otolaryngology January 17-29. Speakers will include:

Dr. Isidore Friesner, New York.
Dr. James Watson White, New York.
Dr. Thomas E. Carmody, Denver.
Dr. Frederick T. Hill, Waterville, Maine.
Dr. Dean M. Lierle, Iowa City.
Dr. Arthur W. Proetz, St. Louis.
Dr. Robert F Ridpath, Philadelphia.
Dr. Leroy A. Schall, Boston.
Dr. John J. Shea, Memphis.
Dr. Georgiana M. Dvorak Theobald, Oak Park, Ill.

A special course in "Applied Anatomy and Cadaver Surgery of the Head and Neck" will be held January 28-February 1 with Drs. Simon Jesberg, associate clinical professor of surgery (otology, rhinology and laryngology), University of Southern California School of Medicine, Los Angeles, and Samuel A. Crooks, associate professor of anatomy, Loma Linda College of Medical Evangelists, as the instructors.

DISTRICT OF COLUMBIA

Soldier's Death from Rabies First in Forty Years.—The first human fatality from rabies in Washington in nearly forty years was announced November 29 by the district health department. Sgt. Harold L. Whitman, on duty at the Army War College, died November 27 as the result of rabies contracted last August when he was bitten by a stray dog on the college grounds. The dog was later found to be infected. Sergeant Whitman was given the Pasteur treatment at the Walter Reed General Hospital and after several weeks was returned to duty. On November 23 he became nervous and apprehensive, newspapers reported, and was admitted again to Walter Reed General Hospital. Death occurred shortly before midnight November 27. In a statement to the press, Dr. James G. Cumming, director of the bureau of preventable disease for the district health department, stated that the size of the bite militated against the effectiveness of the Pasteur treatment.

ILLINOIS

Southern Illinois Medical Officers.—Dr. Ralph S. Sabine, Murphysboro, was named president of the Southern Illinois Medical Association at its meeting in Anna, November 5. Other officers include Drs. Lewis F. Barger, Golconda, and Charles D. Nobles, Anna, vice presidents, and Willis I. Lewis, Herrin, who was elected secretary-treasurer for the fifth consecutive time.

Chicago

Personal.—Dr. Max Thorek was presented wth the Mexican Order of the Aztec Eagle at a dinner on December 2 in recognition of his contributions to medicine and surgery.

Dr. Hektoen Reelected Chairman of Cancer Committee.—At the annual meeting of the Chicago Cancer Committee, Inc., held December 6 at the Institute of Medicine of Chicago, Dr. Ludvig Hektoen was reelected chairman. Dr. Hektoen is executive director of the National Advisory Cancer Council and has been chairman of the Chicago Cancer Committee since its organization in 1941.

Citizen Fellowships Awarded to Laymen.—The Institute of Medicine of Chicago at its twenty-eighth annual meeting in the Palmer House, December 7, awarded citizen fellowships to Mr. Charles B. Goodspeed, president of the board of Presbyterian Hospital, Sidney L. Schwarz, director of the executive committee of the board of trustees of Michael Reese Hospital and Miss Gwethalyn Jones, who among other philanthropies established the Thomas D. Jones Memorial Clinic Building for the Children's Memorial Hospital. The three guests of honor were cited for their meritorious contributions to the health and welfare of the community. Frederick B. Noyes, D.D.S., gave the presidential address, on "Personal Recollections of a Leader, Greene Vardiman Black: His Development and Influence."

INDIANA

Advisory Health Council Named.—The Jackson County Health Council has been organized to serve as an advisory unit to the Jackson County Health Department, newspapers reported on October 22. The new council will assist in coordinating efforts of local health and social agencies. Dr. Louis Henry Osterman, Seymour, was named chairman of the group.

Fatal Case of Cadmium Poisoning.—One worker died within four days after a prolonged exposure to high concentration of cadmium fumes in an Indiana plant, according to *Industrial Hygiene*. The deceased worker undertook a job of "flanging" 2 inch cadmium plated stainless steel pipe. To produce a flange, the pipe was heated with a blow torch until the pipe became a cherry red. Soon after beginning the operation the employees complained about irritation of the nose and throat as well as the thick blue smoke present in the workers' environment. Within four hours 2 employees were violently ill and were taken home. Vomiting, chest pains and shortness of breath were the chief symptoms at this time. The chest symptoms of 1 worker increased and within four days this worker died of a severe chest involvement.

IOWA

Five Day Treatment of Syphilis Begins in Three Centers.—Three centers have been established in Iowa for the start of the first decentralized program of five day treatment of syphilis in the state. The centers are at Broadlawns Polk County Public Hospital, Des Moines, where the treatment has been carried on since 1939, University Hospitals, Iowa City, and St. Joseph Mercy Hospital, Sioux City. Treatment of both men and women is to be effected in cooperation with practicing physicians and health officers, who may refer for treatment patients with early cases of infectious syphilis (under two years' duration) or those infected with gonorrhea. On completion of treatment all patients will be returned to the referring physician with recommendations for continued observation. The state department of health will furnish transportation to the centers for indigent patients. No charge will be made for any service, and no distinction will be made as to race or financial status. Similar centers have been established in Omaha, St. Louis, Chicago, Indianapolis and Denver.

KENTUCKY

Physician Named Director of Near East Foundation.—Dr. Wilson F. Dodd, medical director of the Berea College, Berea, has been appointed medical director of the Near East Foundation in Greece. According to the Berea *Citizen*, Dr. Dodd was to take passage sometime in October for Cairo, Egypt, where he will remain until Greece is open for rehabilitation work.

Personal.—Dr. Stefanie Young, formerly of Hartford, Conn., has been appointed college physician at Eastern Kentucky State Teachers College, Richmond, succeeding Dr. Henry C. Jasper, who had been acting college physician since the resignation of Dr. Jacob D. Farris.——Major David W. Barrow, M. C., A. U. S., received first prize for scientific exhibits during the meeting of the Southern Medical Association in Cincinnati in November. Major Barrow's work was a chart

and graph exhibit illustrating the results of a violent explosion involving some 200 men, more than 50 of whom were killed or injured.

Socialized Medicine Will Force Members to Close Offices.—The Christian County Medical Society recently adopted resolutions stating that members would be asked to close their offices and cease to practice if congress passed the bill the medical group charges would socialize medicine, according to the Louisville *Courier-Journal*, November 7. The newspaper further states that the society charged the proposed legislation would "make the surgeon general of the United States a medical dictator over the medical services of 93 per cent of our people," giving him powers that would be "absolute, as much so as a Nazi dictator." Closing of doctors' offices in Christian County, the resolution stated, would show the public "that we mean not to have national socialism in the United States."

MICHIGAN

New President of W. K. Kellogg Foundation.—Emory W. Morris, treasurer, assistant secretary and general director of the W. K. Kellogg Foundation since 1940, was elected president of the foundation's board of trustees at the recent annual election of officers in Battle Creek. He succeeds George B. Darling, Dr.P.H., who resigned as president and comptroller of the foundation to join the National Research Council, Washington, D. C. (THE JOURNAL, November 27, p. 849).

MINNESOTA

License Revoked.—On November 5 the Minnesota State Board of Medical Examiners revoked the license to practice in the state of Dr. Gustav D. Eisengraeber, Minneapolis, on the charge of "procuring, aiding and abetting a criminal abortion." On November 2 Dr. Eisengraeber was given a suspended sentence of up to ten years in the state penitentiary and placed on probation for five years. According to the *Bulletin* of the Hennepin County Medical Society, Dr. Eisengraeber previously had pleaded guilty to a charge of first degree manslaughter resulting from the death of a woman following an illegal operation.

Imprisoned for Illegal Shipments of Abortion Paste.—Mrs. Anne M. Jenks, White Bear Lake, was sentenced to nine months' imprisonment in the Women's Reformatory at Shakopee and fined $200 for violating the Federal Food, Drug and Cosmetic act. Mrs. Jenks was indicted by a federal grand jury in St. Paul, June 29, on twenty counts for alleged violations of the law. On January 19 she had been permanently enjoined from shipping in interstate commerce a drug labeled "Intrauterine Paste" (THE JOURNAL, March 6, p. 775) or "Dependon Products Paste," manufactured and sold by Mrs. Jenks at White Bear Lake. The injunction followed a lengthy trial in which the government called 46 witnesses, 39 of whom were physicians. Six of the witnesses were confessed criminal abortionists. The court, in its findings, held that the paste "is unsafe and dangerous to health and has caused fatalities and serious injury." The court also found, as a matter of law, that the paste was misbranded and that the labeling was false and misleading. At the conclusion of the injunction suit Mrs. Jenks was fined $250 for contempt of court and her husband, W. S. Jenks, was fined $500 for a similar offense growing out of the shipment of the paste to a Missouri physician after the court had issued a temporary injunction on Oct. 31, 1942.

MONTANA

Election of State Medical Board.—At a recent meeting of the Montana State Board of Medical Examiners in Helena Dr. Allen R. Foss, Missoula, was elected president, Dr. Cedric H. Nelson, Billings, vice president and Dr. Otto G. Klein, Helena, secretary. Other members of the board are Drs. Earl S. Porter, Lewistown, and John H. Garberson, Miles City.

NEW JERSEY

License Revoked.—The New Jersey State Board of Medical Examiners recently revoked the license to practice medicine and surgery of Dr. Louis George D'Elia, Secaucus, following his conviction of a violation of a federal narcotic law.

Drive to Reduce Whooping Cough.—In an effort to reduce whooping cough in New Jersey, the state has made available a vaccine to sixty centers in the state to help combat the disease. Newspapers report that whooping cough caused 45 deaths in New Jersey last year, 43 among children less than 5 years in age. In all, 12,461 cases were reported during the year. The preventive vaccine, now available at the sixty centers throughout the state, may be obtained for children and adults by physicians, hospitals and local health boards.

NEW YORK

Course for Orthoptic Technicians.—The Rochester Orthoptic Center, approved by the Monroe County Medical Society, announces a course for orthoptic technicians. Additional information may be obtained from Mrs. Margaret Lundean, 31 North Goodman Street, Rochester.

Graduate Lectures.—Dr. Barton F. Hauenstein, Buffalo, will discuss "The Present and Postwar Importance of the Dysenteries" in a graduate lecture before the Broome County Medical Society at Binghamton, January 11, and Dr. Harry Most, New York, "The Importance of Early Diagnosis and Treatment of Falciparum Malaria," February 8. Dr. Clayton W. Greene, Buffalo, will lecture before the Greene County Medical Society, December 23, Catskill, on "What Can We Do for Angina Pectoris and Coronary Occlusion?" Dr. Leon H. Griggs, Syracuse, discussed "Industrial Dermatoses" before the Jefferson County Medical Society, Watertown, December 9. These graduate lectures are sponsored jointly by the state medical society and the state department of health.

New York City

License Restored.—On November 13 the license to practice medicine in New York of Dr. Morris Sternberg, Brooklyn, was ordered reinstated by the order of the commissioner of education. Dr. Sternberg's license had been suspended by a vote of the board of regents in November 1941 for a period of six months.

Mental Hygiene Committee Creates Rehabilitation Division.—The National Committee for Mental Hygiene has established a division of rehabilitation under the direction of Dr. Thomas A. C. Rennie, associate professor of psychiatry at Cornell University Medical College. The new division will act as a point of clearance in the field of rehabilitation and a source of advice to those responsible for the federal rehabilitation program, according to *Mental Hygiene*.

Rules Amended for Communicable Diseases.—At a meeting November 16 the city department of health adopted some changes in its regulations governing the isolation of persons affected with communicable diseases. Places occupied by patients with scarlet fever, diphtheria and acute anterior poliomyelitis will no longer be placarded. The isolation period in the uncomplicated case of scarlet fever in a person 16 years of age or over has been reduced to fourteen days from the day of onset, the present twenty-one day period of isolation being retained for persons under 16 years of age except during the months of June through October, when the isolation period will also be only fourteen days. In the future whenever in the household of a case of scarlet fever another illness occurs commonly due to Streptococcus hemolyticus, the latter patient will be required to comply with the provisions for scarlet fever. In cases of acute anterior poliomyelitis all stools shall be disinfected immediately, in accordance with recent reports emphasizing that the virus can be recovered from the stools of patients with the disease.

Advisory Committee Named for Health Education Bureau.—An advisory committee of physicians, educators and publicists has been created to assist the health education bureau of the city department of health. The department aims to expand its health education program into new phases, such as cancer control, and the prevention of rheumatic heart disease and home accidents. The new committee will advise on these projects. Dr. Donald B. Armstrong, third vice president of the Metropolitan Life Insurance Company, is chairman of the new group, which includes the following members:

Bailey B. Burritt, chairman of the executive council of the Community Service Society.

Dr. Iago Galdston, executive secretary of the Committee on Medical Information of the New York Academy of Medicine.

Dr. Joseph Golomb, chairman of the public health committee of the Bronx County Medical Society.

Leon Lovine, assistant director of education of the Columbia Broadcasting System.

Dr. Edwin P. Maynard Jr., Brooklyn, chairman of the New York Heart Association.

Dr. Harry S. Mustard, professor of preventive medicine of the De Lamar Institute of Public Health, Columbia University College of Physicians and Surgeons.

Frank J. O'Brien, associate superintendent of schools.

Donald Payne, vice president of Young & Rubicam, advertising agency.

Dr. Charles A. Perera, chairman of the special committee on publicity, education and illegal practice of medicine of the New York County Medical Society.

Paul F. Stricker, executive vice president of the Greater New York Safety Council.

Mrs. Katherine Z. W. Whipole, health education secretary of the New York Tuberculosis and Health Association.

Dr. Charles C. Wilson, professor of health and physical education of Columbus University Teachers College.

OHIO

Annual Meeting.—The Ohio State Medical Association will hold its annual meeting in Columbus May 2-4 instead of May 9-11 as previously announced.

Dr. Howard Dittrick Named Editorial Director of Clinic Foundation.—Dr. Howard Dittrick, editor in chief of the *Bulletin* of the Academy of Medicine of Cleveland, has been appointed editorial director of the Cleveland Clinic Foundation. Dr. Dittrick retired from practice December 1 and will take over his new work January 1. He will continue his work as an attending physician to the student health service at Western Reserve University and as directing editor of *Current Researches in Anesthesia and Analgesia*. In his new activities he will have charge of editorial work, exhibits, museums, library, and art and photographic departments. He will also be secretary of the Frank E. Bunts Educational Institute. Dr. Dittrick graduated at the University of Toronto Faculty of Medicine, Ontario, in 1900. He formerly served on the staff of Western Reserve University School of Medicine. He has been president of the Cleveland Medical Examiners Society and trustee and director of the Museum of Historical and Cultural Medicine of the Cleveland Medical Library Association. The Academy of Medicine recently presented its distinguished service award for 1943 to Dr. Dittrick for his long service to the academy.

Surgical Fellowship Fund Honors Physicians.—The board of trustees of the Cleveland Clinic Foundation has given a fund of $50,000 to Western Reserve University School of Medicine, Cleveland, the income to be devoted to surgical fellowships for accredited postgraduate students chosen by the medical school faculty. The fund is named for Drs. Frank E. Bunts, George Crile and William E. Lower, who founded the Cleveland Clinic in 1921. According to the *Voice of Reserve* the trustees will add to the fund from time to time. The trustees also contemplate a grant for postgraduate fellowships in medicine to be named in honor of Dr. John Phillips, chief of the division of medicine of the clinic, who died in the Cleveland Clinic Disaster of May 1929. The announcements were made during a dinner commemorating the one hundredth anniversary of Western Reserve University School of Medicine (THE JOURNAL, October 16, p. 430), at which honorary degrees were awarded to Drs. George H. Whipple, Rochester, N. Y., and Reginald Fitz, Boston, who were given degrees of doctor of science, and to Frederick C. Waite, Ph.D., and Dr. William T. Corlett, Cleveland, the degrees of doctor of humanities and Dr. Torald H. Sollmann, dean of the medical school, doctor of laws.

OKLAHOMA

Dr. Fletcher Chosen to Teach Surgical Diagnosis.—Dr. Archibald G. Fletcher, Philadelphia, has been employed to teach surgical diagnosis in the state during 1944 and 1945. He will conduct the fourth postgraduate course for physicians to be offered under the auspices of the Oklahoma State Medical Association with financial assistance from the Commonwealth Fund of New York and the state department of health. The course will open in the northeastern section of the state in February. During the past year Dr. Fletcher has been with the Medico-Chirurgical College, Graduate School of Medicine, University of Pennsylvania. He formerly served with the American Presbyterian Mission, Taikyu, Chosen, and will remain in the United States for the duration.

OREGON

University News.—On December 22 Col. Charles K. Berle, M. C., U. S. Army, commanding officer of Barnes General Hospital, Vancouver, Wash., will deliver the commencement address at the University of Oregon Medical School, Portland. Sixty-three graduates will receive their diplomas in the second class to be graduated in 1943. Dr. Knox H. Finley has been appointed clinical professor and head of the division of psychiatry at the medical school to succeed Dr. Henry H. Dixon, who has been commissioned a lieutenant commander in the navy. Dr. John H. Benward has been named assistant medical director of the Doernbecher Children's Hospital Unit to succeed Dr. Paul V. Woolley Jr., who has been assigned to Bethesda, Md., as a lieutenant in the navy.

WASHINGTON

Work Starts on Doctors Hospital.—Ground was broken, November 13, for the new Doctors Hospital, Seattle, to be constructed at a cost of more than $800,000 and to provide for 200 patients. The new building will consist of two floors, with basement and sub-basement space. The first floor will have facilities for maternity patients, and the second floor will contain five operating rooms and two wings of rooms for 80 patients. The plan for Doctors Hospital started about ten years ago, when a committee of the King County Medical Society authorized the establishment of a nonprofit corporation and bureau to provide medical service to subscribers at a monthly rate. More than $200,000 in funds of the organization, accumulated in the ten year period but not subject to use except for the public good, will go toward the financing of the new institution, $600,000 to be received from the federal government.

ALASKA

Tuberculosis Hospitals Proposed.—Tentative plans have been announced in the newspapers concerning the construction of two tuberculosis hospitals in Alaska for the treatment of both white and native patients. One would be located in Juneau and the other at either Nome or Fairbanks, the latter to be for Eskimos. Both would have accommodations for at least 200 beds and cost between 4 and 5 million dollars. Newspapers reported that the Division of Territories and Island Possessions of the U. S. Department of the Interior has agreed to sponsor the project, but operation of the hospital will be a federal agency experienced in this work. According to the Juneau *Empire*, November 4, the proposed plan stemmed from the approximately 2,500 cases of tuberculosis in the Territory of Alaska and the fact that there are less than 100 beds available for the treatment of both white persons and natives.

HAWAII

Dr. Wayson Retires from Active Service.—Dr. James T. Wayson, physician on the board of leper hospitals, Honolulu, and former general health officer of the territory of Hawaii, has retired from active service. Dr. Wayson was born in Port Townsend, Wash., in 1870. After he graduated at the University of California Medical School, San Francisco, in 1891 he was surgeon in the U. S. Cutter Service from 1892 to 1895, when he became attending physician to the Kalihi Hospital for Lepers in Honolulu. He was a member of the board of health of Hawaii from 1905 to 1909, city and county physician to Honolulu from 1911 to 1918 and general health officer of Hawaii from 1918 to 1931. In 1932 Dr. Wayson was instrumental in setting up a separate board of hospitals and settlement to administer the leprosy phase of public health. He held the position of board physician from the time of its inception until his recent retirement.

GENERAL

Special Society Election.—Officers of the Central Society for Clinical Research, chosen at its recent annual meeting in Chicago, include Drs. Cecil J. Watson, Minneapolis, president, Willis M. Fowler, Iowa City, Iowa, vice president and Carl V. Moore, St. Louis, secretary-treasurer.

American Board of Obstetrics and Gynecology.—The next written examination and review of case histories (part I) for all candidates of the American Board of Obstetrics and Gynecology will be held in various cities of the United States and Canada on February 12 (THE JOURNAL, June 19, p. 554). The part II examination will be held at Pittsburgh, June 9-14. Notice of the exact time and place of examination will be sent all candidates well in advance of the examination date. Candidates in military or naval service are requested to keep the secretary's office informed of any changes in address. If a candidate in service finds it impossible to proceed with the examinations of the board, deferment without time penalty will be granted under a waiver of our published regulations applying to civilian candidates. Additional information and application blanks may be obtained from Dr. Paul Titus, secretary, 1015 Highland Building, Pittsburgh 6.

Federal Funds for Relocation of Physicians.—In the Senate an amendment was adopted to the bill proposed by Senator Russell, Georgia, providing an additional appropriation of $345,000 for the United States Public Health Service to enable it to enter into agreements with private practicing physicians and dentists under which, in consideration of the payment to them of a relocation allowance of not to exceed $250 a month for three months plus the actual cost of travel and transportation of the physician or dentist and his family and household effects to a critical area in need of medical or dental care, such physicians or dentists will agree to move to and engage in practice in such area for a period of not less than one year. No action can be taken by the Public Health Service under this authorization except on application of a municipality, county or other local subdivision of government duly approved by the

state health department having jurisdiction over the local subdivision. Furthermore, no contract may be made with any physician or dentist unless he "shall be admitted to practice by the state authority having jurisdiction of such new location." Each applicant subdivision must contribute $100 to the total cost of the relocation allowance, travel and transportation costs of each physician or dentist and his family obtained by the applicant.

LATIN AMERICA

Health Activities in Latin America.—On November 4 the U. S. Department of State concluded negotiations with the republic of Uruguay preparatory to the establishment of a cooperative program to promote health and sanitation in Uruguav. As in other Central and South American republics in which similar programs are in operation, the Institute of Inter-American Affairs will furnish a group of physicians to be known as the field party to collaborate with the national health department in carrying out the program. Dr. Pascal F. Lucchesi, Montevideo, will be chief of the new field party.

Course on Administration and Organization of Hospitals.—The first regional institute for hospital administrators will be held in Mexico City, January 16-29, under the auspices of the Pan American Sanitary Bureau and the Inter-American Association of Hospitals in cooperation with many other agencies. The Pan American Airways is offering a 25 per cent reduction in transportation to delegates of the congress. Among those participating in the institute will be:

Hon. George S. Messersmith, Ambassador from United States, American Embassy, Mexico, subject not announced.
Mr. Félix Lamela, hospital consultant, Pan American Sanitary Bureau, Washington, D. C., Instruction to Students.
Dr. Vane M. Hoge, chief, hospital facilities section, Bureau of State Services, U. S. Public Health Service, Washington, Surveying, Planning and Construction of Hospitals in a Community.
Dr. Norberto Treviño, Jefe de la Oficina de Estudios de la Secretaria de Salubridad y Asistencia de Mexico, Work Developed by the Study Commission in Relation to Mexico's Hospital Construction Program.
Arq. José Villagrán Garcia, supervisor de Proyectos y Construcciones de Hospitales de la Secretaria de Salubridad y Asistencia, Mexico, Mexican Hospital Architecture.
Dr. Federico Gómez, director del Hospital del Nino de Mexico, Organization and Management of the Hospital del Niño of Mexico.
Dr. Donato Alarcón, director del Sanatorio para Enfermos Tuberculosos de Huipulco, Organization and Management of Tuberculosis Hospitals and Sanatoria.
Dr. Malcolm T. MacEachern, associate director, American College of Surgeons, Chicago, Clinical Records and Hospital Statistics.
Dr. Arthur C. Bachmeyer, associate dean, Division of Biological Sciences, University of Chicago, Hospital Contributions to Professional Education.
Dr. Robert H. Bishop Jr., president, American College of Hospital Administrators, Chicago, Specializations of the Graduate Nurse.
Dr. Mario Garcia Montreil, Postgraduate Studies in Nursing in Mexico.
Mr. Fred A. McNamara, chief, Business Management Section, Budget Bureau, Washington, Economics in the Hospital.
Dr. Demofilo Gonzalez, Jefe de la Consulta Externa del Hospital del Nino, Mexico, Organization of the Outpatient Department.
Dr. Carlos Gómez del Campo, Jefe del Depto: de Fisioterapia del Hospital Central Militar, Organization of the X-Ray and Physiotherapy Department.
Dr. Luis Gutiérrez Villegas, Jefe de Laboratorios del Hospital del Nino, Organization of the Clinical Laboratory.
Dr. Alberto Mejia, Medicinas Y Drogas—Distribucion Y Manejo.
Mr. Walter Dashiell, senior sanitary engineer, Caribbean Unit, Pan American Sanitary Bureau, Guatemala, Sanitary Engineering.
Mr. Luis Villaseñor, superintendente del Hospital del Nino, Mexico, Physical Plant and Maintenance.
Dr. George C. Dunham, assistant coordinator, Office of the Coordinator of Inter-American Affairs, Washington, Military Hygiene.
Dr. Alfonso Cabrera, director del Hospital Central Militar de la Secretaria del la Defensa Nacional, Mexico, Organization of Hospital Militar.
Dr. George Baehr, chief medical officer, Office of Civilian Defense, Washington, Hospitals During the War and Postwar Periods.
Dr. Ramon del Villar, Military Hygiene in Mexico.
Drs. Manuel Martinez Báez, subsecretario de Salubridad y Asistencia and Warren F. Draper, assistant to the surgeon general, U. S. Public Health Service, Washington, Hospitals in the Public Health Panorama (a symposium)
Maria Elena Rincon, director of Medical Social Service, Hospital Infantil, Mexico, Medical Social Service and the Hospital.
Miss Edith Baker, principal consultant, Medicosocial Service, Children's Bureau, Washington, Medical Social Service in the Community.

Dr. Salvador Zubirán, consultor y supervisor Técnico de Hospitales de Mexico, is director of the institute and Dr. Gustavo Baz, secretario de Salubridad y Asistencia, is president of the executive committee.

Care of Rubber Workers.—In Honduras it has been decided to extend the medical care of rubber workers for another six months, the only change being that the Rubber Development Corporation will no longer be responsible for provision of lodging and food for medical aides employed by the service.

Venereal Disease.—A venereal disease program was recently launched in Tegucigalpa, Honduras. A clinic will occupy space in the health center building now being constructed there.

New Construction.—A public health center has been opened in Choluteca, Honduras, and one in Trujillo. Construction is going forward on a health center and ministry of health building in Paraguay. A new center has started operation in Encarnacion and one is under construction in Villarrica, Paraguay.

Personal.—Dr. Thomas Fort Sellers, special consultant to the Institute of Inter-American Affairs, left Atlanta, Ga., on November 9 for Bogotá, Colombia, where he will study the present organization of the National Institute of Hygiene in Colombia and prepare a report thereon for submission to the minister of labor, health and social welfare of the Colombian government.

Malaria.—An epidemic of malaria occurred in Tegucigalpa, Honduras. A search for the source of breeding of malaria bearing mosquitoes revealed an extensive area in the La Granja section of Tegucigalpa. A malaria survey was made in the Hernandarias region of the upper Parana River recently in connection with the plan of the Paraguayan government to locate a resettlement colony there. Brazil plans to increase its production of pyrethrum, which is used to "bomb" malaria carrying mosquitoes and other insects.

Tuberculosis.—The office of the coordinator of Inter-American Affairs announced that the Inter-American republics are intensifying their campaigns against tuberculosis, which is second only to malaria as a "killer" in Spanish America. Special agencies have been created to cooperate with the Institute of Inter-American Affairs, and hospitals, health centers and dispensaries are being constructed to expand the antituberculosis programs. Mobile x-ray units are being used and health personnel is being trained especially for the work. In many areas existing facilities for the treatment and prevention of malaria are being used for antituberculosis work, pending the construction of health centers. In Honduras the cooperating Servicio Cooperativo Interamericano de Salud Publica has established a new tuberculosis dispensary at Tegucigalpa and is building other sanatoriums. A visiting nurse service has been created and clinics organized to serve as diagnostic units. El Salvador's national department of health maintains tuberculosis dispensaries at San Salvador and Santa Ana, with additional control work carried out in health centers established by the Salvadorean Servicio Cooperativo. A mobile x-ray unit is making a systematic survey of tuberculosis in a large area of the central American republic, with full time graduate nurses supplementing the work by running down cases and sources of infection. Nicaragua has a special administrative division for tuberculosis work, with nurses' training as one of its most important objectives, in cooperation with the Servicio Cooperativo. Additional control measures for Nicaragua will include x-ray equipment at the National Health Department's clinic in Managua, a 12 bed tuberculosis pavilion at the San Pablo Hospital in Bluefields, a 50 bed pavilion attached to the Managua General Hospital and a smaller one at the San Juan de Dios Hospital at Granada. A public health education project to control the disease has been launched. Bolivia, Colombia and Ecuador are making progress in reducing the death rate from tuberculosis through the cooperative efforts of the Institute of Inter-American Affairs and the cooperating Servicio in those countries. In Bolivia the Servicio Cooperativo is formulating a program for tuberculosis control on a nationwide scale. Work has been started in Colombia with intensive campaigns against the disease in Buenaventura, Istmina and other communities, while Ecuador's Servicio Cooperativo is building a 300 bed hospital at Guayaquil. Chile and Peru likewise have drawn up plans for tuberculosis hospitals.

Public Health.—A new children's clinic has been established in Guatemala to train Guatemalan nurses to be sent to other parts of the country as a public health measure. It is expected that their activities, when trained, will assist in the reduction of the infant mortality rate in Guatemala.

CORRECTION

Freedom from Infection Around Pin Sites.—In the review of "Manual of Fractures: Treatment by External Skeletal Fixation," by C. M. Shaar, Captain, Medical Corps, U. S. Navy, and Frank P. Kreuz Jr., Lieutenant Commander, Medical Corps, U. S. Navy, published in THE JOURNAL, November 27, page 871, the statement appears that the authors have had infection from pins in 157 consecutive cases. The word "not" was unfortunately omitted. The authors have not had infection from pins in 157 consecutive cases.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Nov. 6, 1943.

Reforms in Medical Education

In a letter to the London *Times* Lord Moran, president of the Royal College of Physicians, states that a committee of the college has been engaged in a survey of medical education and is concerned because we are always adding to the curriculum while nothing is ever taken away. Impossible demands are made on the student's time; he is bewildered by hours of listening. The habit of reflection is stamped out by a ceaseless drill of memorizing facts, so that even if he has a disposition to think for himself he is hurried out of it. Recently two committees of the college have issued reports which seek to foster a new way of looking at things. A committee on social and preventive medicine recommends the immediate setting up of professional and lay committees within the medical schools to strengthen the "almoner's department" for the proper understanding of the patient's needs rather than of his means. The failure of many clinical staffs to consult the almoner about their patients is a prevailing defect. It should be part of every clinical examination to search closely into the influences of social and economic factors, and hospital physicians and surgeons should set aside an hour for interviewing relatives and talking about the patient's illness. Hospitals should have a "humanity department" to arrange for a more sympathetic reception of patients and their families, better facilities for lodging the relatives of dying patients and improved bed accommodations so that no patient shall be allowed to die in an open ward. The course of public health in the medical schools should concentrate on social and preventive medicine and bring the student into close contact with the appropriate organizations in the community.

A committee on psychologic medicine refers to the shortcomings in psychiatric training. Newly qualified doctors should be trained to deal with common psychiatric problems. Study of normal psychology should precede the period of clinical teaching. At the beginning of the first clinical year there should be an introductory course on the psychiatric aspects of clinical medicine. There should be a systematic course on psychiatry throughout the clinical period in which psychiatric outpatients, psychiatric centers, visits to mental institutions, child guidance clinics and pediatric outpatient departments should play a part. Psychiatry and preventive medicine are beginning to find common ground in social study. Skilled assessment of the home and working conditions is frequently necessary. A clinician attached to the department of preventive medicine should therefore be appointed as supervisor of social studies to work in cooperation with all clinical departments.

The Health of Nurses

A committee of King Edward's Hospital Fund for London, under the chairmanship of Sir Charlton Briscoe, has drawn up a memorandum of minimum standards for care of the health of hospital nurses. It is recommended that a physician should be appointed for the nursing staff, whose responsibilities should not be limited to treatment of the sick but relate primarily to maintaining a good standard of health. Hospitals should require a detailed medical certificate with full family history from a nursing candidate's own doctor. A medical examination, including x-ray examination of the chest and hemoglobin estimation, should take place before or on admission. This should be repeated within six months of admission to the preliminary training school, at the end of the first year and annually thereafter. Records of these examinations and of the nurse's weight, taken quarterly, should be kept by the physician. No candidate should be accepted for training unless she has been vaccinated against variola and immunized against diphtheria. (At present this practice is observed only in one fourth of the training schools.)

Important recommendations are made with regard to diet, accommodations and hours of duty. Nurses should have three good meals a day besides tea. Each nurse should if possible have a room to herself with a floor area of at least 100 square feet. Baths and lavatories should be provided in the ratio of one to five or six nurses. A ninety-six hour fortnight on duty should be the maximum. The practice of allowing girls under 18 years of age to nurse patients with tuberculosis and other unsuitable conditions is deplored.

A complaint is made in some quarters of difficulties encountered by the nurse who reports herself sick, and there seems to be a general feeling among nurses that it takes courage to report sick unless she had a high temperature or some other unmistakable sign or symptom. The committee feels that it is a short sighted and mistaken policy not to make certain that even minor ailments receive early attention. Nurses should be encouraged to report as soon as they feel unwell. All nurses off duty should receive immediate medical care and should not be allowed to return to duty until passed as fit by a physician. A sickbay should be set aside for the nursing staff.

Good Health of the Population in Wartime

The remarkable fact that on the whole the health of our people has improved, notwithstanding the restrictions of the greatest of all wars, is again borne out by the latest reports. In an address to the Provisional Council for Mental Health the minister of health, Mr. Ernest Brown, stated that the stress of the war had not led to any increase in the more serious mental disorders. Admissions to mental hospitals have been substantially below the prewar average. The most probable explanation is the improvement in employment due to the war. Mental disorders, except schizophrenia, generally occur in middle and later life, and money worries are one of the principal stresses which lead to the breakdown of unstable persons. We all have many anxieties in this war, but unemployment is not one of them. Our experience confirms that of the Spanish civil war, in which war stresses did not increase the incidence of psychoses. There has been an increase, however, the extent of which cannot yet be measured, in the incidence of neuroses. A problem confronting us is the care of service men and women discharged from mental units and neurologic centers. Some scheme of after-care must be provided for those who need it, so that they will not become a burden to themselves and to the community. Skilled help must be given them in their struggle to become adjusted to civilian life and to get the kind of work for which they are suited. The Provisional National Council for Mental Health has been asked by the government to cooperate with the Mental After-Care Association in organizing a scheme to provide after-care in the patient's own home after discharge from the hospital.

In his interim report for 1942 Dr. W. A. Daley, county of London medical officer, shows that the health of Londoners during the third year of the war was satisfactory. The public health services, which the heavy bombing of London in 1940 and 1941 never succeeded in seriously disorganizing, were able to deal with any difficulties created by the occasional raids of 1942. The figures of births and deaths were, generally speaking, favorable. In 1942 there were 40,654 births, compared with 33,944 in 1941, and there were fewer deaths from all causes, 36,057 compared to 43,537 in 1941. There was also a reduction almost to the immediate prewar level in the death rate of infants. Maternal mortality—2.51 per thousand live births—was

lower than the figure for 1941, which was 3.05. On the other hand there was the usual war increase in tuberculosis: 5,540 cases compared to 5,252 in 1941. But there was a substantial reduction in the number of deaths from tuberculosis, 2,447 against 2,895 in 1941. Routine medical inspection showed that the health of school children was well maintained. An investigation into the value of giving children capsules containing vitamins A, B, C and D did not show any improvement in general health. This is evidence that their diet already contained a satisfactory supply of these vitamins.

PALESTINE

(From Our Regular Correspondent)

Oct. 15, 1943.

Infectious Hepatitis in Palestine

An instructive report has been given by Dr. Max Leffkowitz concerning infectious hepatitis in Palestine during the years 1941-1943. In his report Leffkowitz stated that the endemic occurrence of infectious hepatitis in this country has long been a generally accepted fact. As soon as the cold season sets in (October-November), almost invariably the number of cases begins to increase. Toward the end of 1941 a particularly severe outbreak was recorded. The social importance of the disease will be gathered from the morbidity statistics of the Jewish Workers' Sick Fund. With its more than 180,000 members, it can be considered representative of the whole civilian population in Palestine. From January 1941 to March 1943, 5,380 people fell sick with jaundice. This figure includes 3,887 cases during the epidemic period which started in July 1942. The statistics available, however, based on reported cases give only minimum data, and the morbidity rate can be estimated on a conservative basis as 4 per cent for the whole period.

A few cases in which hepatitis runs its course without the accompaniment of jaundice are a common occurrence. But as the source of data concerning this "hepatitis sine ictero"—a not very clearly outlined syndrome—are the private observations of a number of general practitioners, their number can only be estimated; so it must be supposed that for every 10 cases with jaundice 1 occurs without that symptom.

The incubation period of the jaundice, according to observations during the last epidemic, was twenty-one to thirty-one days. The danger of infection was apparently greatest in the first week after the outbreak of the disease. The average duration of the jaundice was twelve to fourteen days. Milder and more severe cases, lasting for four and more months, have been observed. Generally, jaundice disappeared without residue. Sometimes a sensitiveness in the region of the liver and urobilinuria were present for years after the acute illness. Immunity obviously takes place after the first attack of the jaundice, since recurrences have never been reported.

Clinically, no differentiation between the endemic and the sporadic type has so far been possible. As to the mode of transmission, all the evidence is in favor of direct contact; but there may also be communication through the agency of healthy carriers or abortive cases, probably by means of droplet infection. The infection usually develops where large crowds are gathering, particularly in the communal settlements and in the children's houses attached to them.

A special disposition toward jaundice was found among new immigrants, independent of age and sex. Children were more affected only when living in special children's houses. The disease took a more severe course during pregnancy, causing miscarriages and even deaths. Thus during the course of an epidemic in a country settlement, among 1,600 people 120 were attacked (7.5 per cent), while 7 of 8 pregnant women present there at that time contracted the infection, which in 4 led to abortion.

New Cutaneous Test in Bacillary Dysentery (Flexner)

At a meeting in Jerusalem in August, F. Dreyfuss and J. Gurevitch gave a short outline of their work with serologic examination and a cutaneous test in bacillary dysentery (Flexner). They discussed the difficulties usually encountered in diagnosis of bacillary dysentery, especially in chronic cases, in which cultures of the stools are rarely positive. After reviewing the controversial opinions of several authorities on serologic tests as an aid in laboratory diagnosis of bacillary dysentery and in detection of carriers, they deal with their own experience in this field, assuming a titer of Flexner agglutination 1:100 as suggestive of a previous infection. In order to improve the diagnostic results they have devised a test of cutaneous sensitivity to Bacterium flexneri vaccine, which is performed by injecting 0.1 cc. of a vaccine containing 50,000 organisms per cubic centimeter into the skin. An infiltration and swelling accompanied by intense reddening of the skin in a diameter of 3 to 4 cm. or more after twelve to twenty-four hours is considered as a positive response and seems to indicate an infection by B. flexneri.

Both methods have been applied in 69 cases, including controls, together with the usual means of laboratory and clinical examination. The test was studied in definite cases of acute bacillary dysentery when its results were positive, whereas the controls gave negative results. Both diagnostic methods have, in their opinion, proved their usefulness.

The Development of Gametocytes from Extraerythrocytic Forms in Plasmodium Gallinaceum

S. Adler and J. Tchernomoretz, from the Department of Parasitology, Hebrew University, Jerusalem, reported in the September issue of the *Journal of the Palestine Jewish Medical Association* on the development of gametocytes from extraerythrocytic forms in Plasmodium gallinaceum. Adult fowls were given 150 mg. of quinine hydrochloride daily after inoculation with Plasmodium gallinaceum by the bites of Aedes aegypti. When the red cells showed a sufficient infection with small nonpigmented parasites the quinine was stopped. Thus the extraerythrocytic forms were the only possible source of these parasites in the red cells.

As the result of studies of the development of the parasites in the red cells after the cessation of quinine administration the authors stated that after twenty-seven and one-half hours the young gametocytes could be recognized and their maximum size is completed before the first cycle of erythrocytic schizogony. The extraerythrocytic forms therefore produce merozoites, which invade red cells and develop directly into gametocytes.

The Polish Golden Cross for Merit for Prof. I. J. Kligler

Prof. I. J. Kligler, head of the Department of Hygiene of the Hebrew University, was recently decorated with the Polish Golden Cross for Merit. The award has been made in recognition of Professor Kligler's services to Polish refugees in supplying them with typhus vaccine prepared in his department.

Marriages

Albert Frawley Jackson Jr., Eutaw, Ala., to Miss Maurice Brown of Fort Worth, Texas, in October.

Francis A. Lieberman, Allentown, Pa., to Miss Kathryn R. Ryan at Catasauqua, October 30.

Thomas Virgil Matthews to Miss Eleanor Adele Rhodes, both of Atlanta, Ga., October 9.

Frank R. King, Greenriver, Utah, to Miss Eldarene Settlemier of Duchesne, August 22.

Arthur N. Kitenplon to Mrs. Elsie Jefferys, both of Aurora, Ill., October 12.

Deaths

Thomas Andrew Storey ⊕ Atlanta, Ga.; Harvard Medical School, Boston, 1905; assistant professor of hygiene at the Stanford University, from 1902 to 1906, professor and director of hygiene and physical education from 1926 to 1929 and general director of the school of hygiene and physical education from 1929 to 1940; organized the department of hygiene, associate professor of physical instruction and training from 1906 to 1910, professor of physical instruction and hygiene from 1910 to 1913 and professor of hygiene from 1913 to 1926 at the College of the City of New York; served as president, Northern California Public Health Association; fellow of the American Association for the Advancement of Science, American Academy of Physical Education, American Public Health Association and the American Physical Education Association; member of the American Physiological Society, Society of Experimental Biology and Medicine and the San Francisco Academy of Medicine; president of the Society of Directors of Physical Education in Colleges, 1908-1909, and the American Student Health Association from 1925 to 1927; member of the hygiene reference board of the Life Extension Institute; state inspector of physical training with military training commission, Albany, from 1917 to 1921; secretary general of the fourth International Congress on School Hygiene and editor of its proceedings; chairman of the National Conference on College Hygiene in 1931; executive secretary of the U. S. Inter-Departmental Social Hygiene Board, Washington, D. C., from 1918 to 1921; since 1940 special consultant, American Social Hygiene Association; author of the New York state program and syllabus on physical training; in 1926 awarded the Luther Halsey Gulick Medal "for distinguished service in physical education and allied fields"; died in the Crawford W. Long Hospital October 27, aged 68, of coronary thrombosis and arteriosclerosis.

Lyman Brooke Tibbets ⊕ Washington, D. C.; George Washington University School of Medicine, Washington, 1921; specialist certified by the American Board of Otolaryngology; clinical instructor in otolaryngology at his alma mater; associate surgeon, Episcopal Eye, Ear and Throat Hospital; visiting otolaryngologist, Glenn Dale Sanatorium, Glenn Dale, Md., Gallinger Municipal and the George Washington University hospitals; member of the medical council and otolaryngologist, Sibley Memorial Hospital, where he died suddenly September 19, aged 49, of cerebral hemorrhage.

Martin Luther Arthur, Patoka, Ind.; Medical College of Indiana, Indianapolis, 1898; member of the Indiana State Medical Association; a captain in the medical corps of the U. S. Army during World War I; on the staffs of the Gibson General Hospital, Princeton, and the Protestant Deaconess Hospital, Evansville; president of the Patoka National Bank; died October 20, aged 67, of ruptured aortic aneurysm.

Charles Augustus Atwood, Taunton, Mass.; Harvard Medical School, Boston, 1883; member of the Massachusetts Medical Society; medical examiner in the first Bristol district; member of the staff of the Morton Hospital and a consultant of the Taunton State Hospital; died October 10, aged 82, following an operation on the prostate gland.

Ned Alvin Balding ⊕ Lincoln, Ill.; St. Louis University School of Medicine, 1912; past president of the Logan County Medical Society; served during World War I; on the staffs of the Evangelical Deaconess and St. Clara's hospitals; died suddenly October 6, aged 57.

Frank L. Barnes ⊕ Houston, Texas; College of Physicians and Surgeons, Baltimore, 1896; a member of the founders group of the American Board of Surgery; member of the Southern Surgical Association and the American Association for the Surgery of Trauma; fellow of the American College of Surgeons; veteran of the Spanish-American War; visiting surgeon, St. Joseph's Infirmary; died October 2, aged 71, of coronary occlusion.

Edwin George Henry Beck, Atlanta, Ga.; University of Michigan Homeopathic Medical School, Ann Arbor, 1903; died October 8, aged 65.

Victor Biddle, Steubenville, Ohio; College of Physicians and Surgeons, Baltimore, 1909; member of the Ohio State Medical Association; served during World War I; on the staff of the Ohio Valley Hospital; died October 3, aged 68, of angina pectoris.

Albert Sven Bjornson, Denver; University of Denver Medical Department, 1886; died in a Grand Junction, Colo., hospital October 6, aged 93, of a fractured hip received when struck by an automobile last July.

William Waldo Blackman, Brooklyn; New York Homeopathic Medical College, New York, 1877; medical director of the Prospect Heights Hospital; vice chairman, board of trustees, New York Medical College; died October 20, aged 87, of chronic myocarditis.

Thomas Cleveland Brewer, Dallas, Texas; Southern Methodist University Medical Department, Dallas, 1912; on the staff of St. Paul's Hospital; died October 11, aged 55, of cerebral hemorrhage.

Edward Lyman Brown ⊕ Bloomington, Ill.; Northwestern University Medical School, Chicago, 1894; for many years a member of the board of education; died October 10, aged 79, of heart disease.

Thomas Edward Brown, Brooklyn; University of the City of New York Medical Department, New York, 1890; died October 8, aged 75, of carcinoma of the stomach.

Youra Spence Brown, Halls, Tenn.; Emory University School of Medicine, Atlanta, Ga., 1917; served overseas during World War I; died in the Baptist Memorial Hospital, Memphis, October 6, aged 51, of coronary thrombosis.

Arthur Earnest Burkhardt ⊕ Tipton, Ind.; Indiana University School of Medicine, Indianapolis, 1908; a member of the examining board of the Selective Service of Tipton County; part owner of the Emergency Hospital; on the staff of the Mercy Hospital, Elwood, where he died October 19, aged 67, of coronary occlusion and acute pulmonary edema.

Robert Golden Carlin, New York City; Jefferson Medical College of Philadelphia, 1902; member of the Medical Society of the State of New York; a captain in the medical corps of the U. S. Army during World War I; member of the executive committee, alumni association of Jefferson Medical College; consulting surgeon, Downtown Hospital; surgeon, Midtown Hospital, where he died October 3, aged 65, of cerebral hemorrhage.

Jonas Whittier Carlisle ⊕ Robinson, Ill.; Chicago Physio-Medical College, 1897; for many years a member of the grade and high school boards of education; chairman of the board of health; charter member of the Rotary Club; died in the Robinson Hospital October 8, aged 75, of uremia following an operation for acute intestinal obstruction.

Louis Peter Casper, Louisville, Ky.; University of Louisville Medical Department, 1904; member of the Kentucky State Medical Association; on the staff of SS Mary and Elizabeth Hospital, where he died October 12, aged 61, of acute dilatation of the heart.

George Cerio, Middletown, R. I.; Regia Università di Napoli Facoltà di Medicina e Chirurgia, Italy, 1891; died in the Newport Hospital October 28, aged 77.

Thomas Horace Cheatham ⊕ Fort Worth, Texas; University of Tennessee Medical Department, Nashville, 1903; chief examiner for the Selective Service Board number 6; died October 11, aged 69, of coronary occlusion.

Thomas Vincent Connolly ⊕ Paterson, N. J.; Georgetown University School of Medicine, Washington, D. C., 1913; specialist certified by the American Board of Otolaryngology; fellow of the American College of Surgeons; served during World War I; a member of the fire and police commission; chief otolaryngologist, St. Joseph's Hospital, where he died October 21, aged 53, of embolism following an operation.

Aurelien Constantineau, Woonsocket, R. I.; School of Medicine and Surgery of Montreal, Faculty of Medicine of the University of Laval at Montreal, 1895; member of the Rhode Island Medical Society; on the staff of the Woonsocket Hospital; died October 13, aged 73, of myasthenia gravis.

Harold Monford Cox, Indianapolis; Indiana University School of Medicine, Indianapolis, 1921; served during World War I; member of the Indiana State Medical Association; on the staff of St. Vincent's Hospital, where he died October 14, aged 51, of cerebral hemorrhage.

Vance Monroe Cox ⊕ Bristol, Va.; University of Nashville (Tenn.) Medical Department, 1909; served as medical examiner for the induction center at Abingdon; on the staff of the King's Mountain Memorial Hospital; died in the Johnston Memorial Hospital, Abingdon, October 15, aged 63, of heart disease.

W. O'Connor Cox, St. Paul, Va.; University College of Medicine, Richmond, 1912; director of St. Paul National Bank; died October 20, aged 58, of angina pectoris.

William Eldridge Crain, Swedesboro, N. J.; University of Toronto Faculty of Medicine, 1894; member of the Medical Society of New Jersey; past president of the Gloucester County Medical Society; died October 1, aged 71, of angina pectoris.

Humphrey W. Curtis, Hilton Village, Va.; Medical College of Virginia, Richmond, 1901; died in the Elizabeth Buxton Hospital, Newport News, October 19, aged 66.

William Henry Cushing, Southington, Conn.; Bellevue Hospital Medical College, New York, 1892; for many years school physician and health officer; served on the board of education and as president of the board of water commissioners; on the staffs of the Meriden Hospital, Meriden, and the Bradley Memorial Hospital; died in St. Mary's Hospital, Waterbury, October 1, aged 74, of sarcoma of the bladder.

Theodore Diller, Pittsburgh; University of Pennsylvania Department of Medicine, Philadelphia, 1886; formerly associate professor of neurology at the University of Pittsburgh School of Medicine; member of the Medical Society of the State of Pennsylvania and the American Neurological Association; for many years on the staff of St. Francis Hospital, where he died October 6, aged 80, of heart disease and pneumonia.

William Bernard Donahay, Washington, D. C.; Georgetown University School of Medicine, Washington, 1927; on the staff of the Providence Hospital, where he died October 2, aged 41, of uremia.

Francis Marion Dwight, Wedgefield, S. C.; University of Maryland School of Medicine, Baltimore, 1889; member of the South Carolina Medical Association; died October 17, aged 82.

B. Franklin Eikenberry, Peru, Ind.; the Hahnemann Medical College and Hospital, Chicago, 1896; member of the Indiana State Medical Association; past president of the Miami County Tuberculosis Society; a member of the Rotary Club; served on the staff of the Dukes-Miami County Memorial Hospital; died October 23, aged 73, of carcinoma of the bladder with metastases.

McPherson Gregorie Elliott, Beaufort, S. C.; Medical College of the State of South Carolina, Charleston, 1898; formerly associated with the U. S. Public Health Service; died October 3, aged 71.

Zenas Horace Ellis, New York; University of Vermont College of Medicine, Burlington, 1920; member of the Medical Society of the State of New York and the American Academy of Ophthalmology and Otolaryngology; specialist certified by the American Board of Ophthalmology; formerly instructor in anatomy at his alma mater; died in the Doctors Hospital October 20, aged 48, of ruptured esophageal varix.

John Meeks Firmin ⊕ Findlay, Ohio; University of Wooster Medical Department, Cleveland, 1897; served overseas during World War I; chief of staff, Findlay Hospital; died October 4, aged 70, of acute myocarditis.

Matthew Fishman, Brooklyn; Eclectic Medical College, Cincinnati, 1920; died October 12, aged 50.

Lewis Fox Frissell ⊕ New York; Columbia University College of Physicians and Surgeons, New York, 1900; professor of clinical medicine at his alma mater; fellow of the American College of Physicians; consulting physician, North Country Community Hospital, Glen Cove, N. Y., and St. Luke's Hospital; a director of the Fifth Avenue Bank; died in the Doctors Hospital October 24, aged 71, of cerebral hemorrhage.

Henry J. Johnston, Tontogany, Ohio; Toledo Medical College, 1900; member of the Ohio State Medical Association; a member of the board of health of Wood County; a trustee of the Bowling Green State University; surgeon for the Baltimore and Ohio Railroad; on the staff of the Toledo Hospital, where he died October 30, aged 67, of coronary thrombosis.

Charles Bowden Jones, Summerhill, Pa.; Medico-Chirurgical College of Philadelphia, 1906; member of the Medical Society of the State of Pennsylvania; for many years adviser of the local board of health and member of the Summerhill Borough Council; served as a member and president of the school board; died in the Conemaugh Valley Memorial Hospital, Johnstown, October 9, aged 68, of coronary occlusion.

Major Osceola Jones, Brooklyn; Howard University College of Medicine, Washington, D. C., 1929; member of the Medical Society of the State of New York; died October 8, aged 43.

John Hays Lee, Cannelton, Ind.; Kentucky School of Medicine, Louisville, 1885; member of the Indiana State Medical Association; died in St. Anthony's Hospital, Terre Haute, October 27, aged 86.

Gordon Lindsay, Freeport, N. Y.; Columbia University College of Physicians and Surgeons, New York, 1905; also a pharmacist; on the staffs of the Nassau Hospital, Mineola, and the Meadowbrook Hospital, Hempstead; died October 19, aged 68, of melanosarcoma.

William Armstrong Lindsay ⊕ Niles, Ohio; Ohio Medical University, Columbus, 1898; on the staff of the Warren City Hospital, Warren; died in the Youngstown Hospital, North Side Unit, October 24, aged 69, of carcinoma.

Arthur Singleton Love, Ballinger, Texas; University of Texas School of Medicine, Galveston, 1897; part owner of the Halley and Love Sanitarium, where he died October 12, aged 71, of uremia.

William Johnson Manning, Washington, D. C.; National University Medical Department, Washington, 1903; for many years medical officer of the government printing office; major, medical corps, U. S. Army, during World War I; died in St. James Hospital, Newark, October 27, aged 73, of diabetes mellitus, myocardial degeneration and arteriosclerosis.

Nelvin Merritt Moore, Rock Island, Ill.; Rush Medical College, Chicago, 1895; died October 24, aged 74, of angina pectoris.

Charles Robert Nelson, Jamestown, Kan.; Kansas City (Mo.) Hahnemann Medical College, 1904; member of the Kansas Medical Society; served as health officer of Washington County and coroner of Wood County; formerly on the staff of St. Joseph's Hospital, Concordia; died October 16, aged 65, of Parkinson's disease.

James Deering Nutting, Hallowell, Maine; Baltimore University School of Medicine, 1903; member of the Maine Medical Association; served as chairman of the school board and trustee of the Hubbard Free Library; died in the Maine General Hospital, Portland, October 24, aged 68, of heart disease.

Oscar Burton Ormsby ⊕ Murphysboro, Ill.; St. Louis College of Physicians and Surgeons, 1897; president of the Murphysboro park commission; member of the Rotary Club and chamber of commerce; on the staff of St. Andrew's Hospital, where he died October 24, aged 67, of cerebral hemorrhage.

Walter Harburt Paine, Sealy, Texas (licensed in Texas under the Act of 1907); served on the staffs of the Burns and Lutheran hospitals; died October 14, aged 78, of myocardial degeneration.

John Thomas Peyton, White House, Tenn.; University of Tennessee Medical Department, Nashville, 1888; died October 5, aged 86.

Fred William Phillips, River Rouge, Mich.; Detroit College of Medicine, 1913; member of the Michigan State Medical Society; on the visiting staffs of the Providence and Delray General hospitals, Detroit, and the Wyandotte General Hospital, Wyandotte, where he died October 23, aged 60.

Philip Russell Polk, Morgan City, Miss.; Chattanooga (Tenn.) Medical College, 1901; served during World War I; died October 11, aged 64.

Elisha Pender Porter, Brooklyn; Columbia University College of Physicians and Surgeons, New York, 1900; served on the staff of the Swedish Hospital; died October 23, aged 68, of a self-inflicted bullet wound.

William Newton Pringle, Johnstown, Pa.; Western Pennsylvania Medical College, Pittsburgh, 1889; member of the Medical Society of the State of Pennsylvania; for many years on the staff of the Conemaugh Valley Memorial Hospital; died October 20, aged 87.

John G. Puryear, Mayfield, Ky.; Kentucky School of Medicine, Louisville, 1903; served in France during World War I; died October 22, aged 67.

Conner Ouerbacher Reed ⊕ Bellingham, Wash.; Miami Medical College, Cincinnati, 1904; served during World War I; colonel, medical reserve corps, U. S. Army, not on active duty; served as a member of the board of health and board of education of Bellingham; formerly county coroner; on the staffs of St. Luke's Hospital and St. Joseph's Hospital, where he died October 9, aged 62, of heart disease.

Omar Hollingsworth Rees ✠ Knightstown, Ind.; Medical College of Indiana, Indianapolis, 1900; on the staff of the Henry County Hospital, Newcastle; died October 24, aged 76, of coronary occlusion.

James Jefferson Reitz, Walnutport, Pa.; Hahnemann Medical College and Hospital of Philadelphia, 1903; also a minister; died October 28, aged 83, of coronary disease.

Barton D. Rhodes, Riverside, Ga.; Georgia College of Eclectic Medicine and Surgery, Atlanta, 1906; died October 6, aged 64.

Calvin M. Rice, Ravenna, Ohio; Western Reserve University Medical Department, Cleveland, 1881; died in the Robinson Memorial Hospital October 24, aged 86, of cerebral hemorrhage and pulmonary thrombosis.

Simplicio Righi New York; Regia Università degli Studi di Bologna, Facoltà di Medicina e Chirurgia, Italy, 1897; died in St. Vincent's Hospital October 16, aged 73, of tumor of the bladder.

Charles William Ryan, Battle Creek, Mich.; University of Michigan Homeopathic Medical School, Ann Arbor, 1896; veteran of the Spanish-American War; formerly mayor; died October 15, aged 70.

Roland Eugene Schoen, Beaver Dam, Wis.; Rush Medical College, Chicago, 1903; served as health officer of Beaver Dam and adjoining townships; elected the first chief of staff at St. Joseph's Hospital, where he died October 9, aged 65, of cardiovascular renal disease.

William E. Schoonover, Springfield, Ohio; Pulte Medical College, Homeopathic, Cincinnati, 1885; died October 9, aged 85.

Frank Carpenter Shaut, Savona, N. Y.; Syracuse University School of Medicine, 1905; since 1927 health officer of the village of Savona; on the staff of the Bath Memorial Hospital, Bath; died October 14, aged 65, of heart disease.

Walter Taylor Sheets, Salt Lake City; Columbia University College of Physicians and Surgeons, New York, 1926; formerly on the staff of the Dr. W. H. Groves Latter-Day Saints Hospital; served on the staffs of various Veterans Administration facilities; died in Washington, D. C., October 18, aged 40, of coronary heart disease with thrombosis.

Richard Cotton Shepherd ✠ Scranton, Pa.; Jefferson Medical College of Philadelphia, 1906; chief medical inspector for the city school district; died October 30, aged 65.

MacCormick Smetters, Waverly, Ill.; Bennett College of Eclectic Medicine and Surgery, Chicago, 1898; Rush Medical College, Chicago, 1900; member of the Medical Association of Montana; died in St. John's Hospital, Springfield, October 19, aged 66, of carcinoma of the prostate with metastases and secondary anemia.

Charles Francis Snow, Adamson, Okla.; College of Physicians and Surgeons, Dallas, Texas, 1906; died at Beaumont, Texas, in October, aged 69, of coronary occlusion.

Jesse Greene Storie, Grundy, Va.; Tennessee Medical College, Knoxville, Tenn., 1898; member of the Medical Society of Virginia; died October 20, aged 75, of pneumonia.

James Preston Stubblefield, St. Louis; Hospital College of Medicine, Louisville, Ky., 1906; for many years a minister; died October 25, aged 88, of uremia and chronic nephritis.

Thomas J. Taylor, Rentz, Ga.; University of Georgia Medical Department, Augusta, 1894; died August 26, aged 74.

Clara Louise Hunt Thompson, Boston; College of Physicians and Surgeons, Boston, 1915; member of the Massachusetts Medical Society; served on the staff of the New England Hospital for Women and Children; died September 15, aged 72, of heart disease.

Charles Willis Tidball ✠ Independence, Iowa; Jefferson Medical College of Philadelphia, 1913; served during World War I; for six years a member of the board of education; on the staff of the Peoples Hospital, where he died September 24, aged 55, of coronary occlusion.

Robert Bruce Tilley, Plato, Mo.; University of Missouri School of Medicine, Columbia, 1899; member of the Missouri State Medical Association; died in the Louise G. Wallace Hospital, Lebanon, October 12, aged 70, of pneumonia.

Benjamin Torrens, New York; College of Physicians and Surgeons, New York, 1893; on the staff of the New York Polyclinic Medical School and Hospital; died October 23, aged 71.

John Edward Vassallo, Malden, Mass.; College of Physicians and Surgeons, Boston, 1917; died August 27, aged 63.

Fortunato Vitanza ✠ Philadelphia; Regia Università degli Studi di Roma, Facoltà di Medicina e Chirurgia, Italy, 1907; on the staff of the Lankenau Hospital, where he died October 30, aged 63, of cerebral hemorrhage.

Charles E. Wallace, New Sharon, Iowa; Miami Medical College, Cincinnati, 1884; member of the Iowa State Medical Society; a member of the school board and postmaster; died September 24, aged 85, of cerebral thrombosis.

Frank J. Williams, Butte, Mont.; Chicago College of Medicine and Surgery, 1908; member of the Medical Association of Montana; city physician; on the staff of St. James Hospital; died October 22, aged 59, of coronary thrombosis.

Sam H. Williamson ✠ Harrah, Okla.; Memphis (Tenn.) Hospital Medical College, 1904; died in Oklahoma City September 14, aged 64.

Anna R. Grace Flanders Wilson, Morristown, N. J.; New York Medical College and Hospital for Women, Homeopathic, New York, 1899; died September 13, aged 66, of static pneumonia, chronic myocarditis, myelitis and paraplegia.

LIEUT. (jg) FAY B. BEGOR (MC), U.S.N.R., 1916-1943

William Lester Wilson, Santa Cruz, Calif.; Medical College of Indiana, Indianapolis, 1887; died in the Santa Cruz Hospital October 14, aged 82.

Eugene J. Wolff, Waukomis, Okla.; Missouri Medical College, St. Louis, 1894; member of the Oklahoma State Medical Association; past president of the Garfield County Medical Society; died in the Enid General Hospital, Enid, October 30, aged 74, of coronary thrombosis.

Harry Wells Woodward, Washington, D. C.; Hahnemann Medical College and Hospital of Philadelphia, 1891; died in the Garfield Memorial Hospital October 11, aged 75, of injuries received when struck by a taxicab.

Wade Woodward, Decatur, Ga.; University of Georgia Medical Department, Augusta, 1899; died September 26, aged 75, of heart disease.

Asa Wright, San Antonio, Texas; University of Oklahoma School of Medicine, Oklahoma City, 1913; veteran of the Spanish-American War; died October 23, aged 70, as the result of a fall.

Eugene Cushman Wylie, ✠ Boston; Harvard Medical School, Boston, 1895; an Affiliate Fellow of the American Medical Association; for many years a member of the staff of the Children's Hospital; died September 15, aged 71.

Harry M. Yancey, Mays Lick, Ky.; Medical College of Ohio, Cincinnati, 1896; served in the medical corps of the U. S. Army during World War I; died in the Hayswood Hospital, Maysville, September 17, aged 71, of cardiovascular disease and hypertension.

Francis Albert Young, Montgomery, Texas; Kentucky School of Medicine, Louisville, 1891; member of the State Medical Association of Texas; at one time county health officer; died September 3, aged 90, of heart disease.

KILLED IN ACTION

Fay Broughton Begor, Tahawus, N. Y.; McGill University Faculty of Medicine, Montreal, Que., Canada, 1941; diplomate of the National Board of Medical Examiners; interned at the Montreal General Hospital; commissioned a lieutenant (jg) in the medical corps of the U. S. Naval Reserve on July 22, 1942 and began extended active duty Sept. 1, 1942; decorated posthumously with the medal of the Purple Heart; died in the South Pacific area September 9, aged 26, of multiple wounds and gas bacillus gangrene received in action.

Correspondence

EPIDEMIC JAUNDICE

To the Editor:—According to the observations of Dietrich (*Deutsche med. Wchnschr.* **68**:1 [Jan. 2] 1942), catarrhal icterus and epidemic hepatitis are probably identical diseases of virus origin and, although their course is usually benign, they may lead to cirrhosis or to acute yellow atrophy of the liver. In almost every war in the last hundred and fifty years epidemics of jaundice have been observed among soldiers. In the present as in previous wars it has been noted that this form of jaundice occurs chiefly during the fall and early winter months. An editorial in THE JOURNAL (November 6, p. 636) comments on apparently the same variety of epidemic jaundice observed among troops by Cameron and by Van Rooyen and Gordon. The disease is characterized by abdominal discomfort, an irregular type of fever, jaundice, clay colored stools, absence of leukocytosis and recovery. Animal inoculation experiments are negative.

At this moment and in this connection I think it is important to recall that, during a period of ten weeks commencing the middle of December 1919, 16 patients were admitted to Bellevue Hospital suffering from a variety of acute hemorrhagic jaundice (Symmers, Douglas: Epidemic Acute Hemorrhagic Jaundice of Toxic Origin, THE JOURNAL, April 24, 1920, p. 1153). Of this number 9 died—a mortality of 56.2 per cent. In 6 cases necropsies were done. Clinically and anatomically the disease presented features which, on the one hand, were similar to those of yellow fever and spirochetal jaundice and, on the other, to acute yellow atrophy of the liver. At the time it was a subject of remark that patients with so-called catarrhal jaundice were admitted to Bellevue Hospital during the period of the epidemic in numbers noticeably in excess of the routine experience of previous years, and the possibility was discussed that at least some of them were suffering from a mild form of the epidemic disease.

In 8 of the 16 cases blood from living patients was stained in films for spirochetes, but not one was found. Appropriate quantities of fresh blood or urine, or both, depending on the stage of the disease, were injected into guinea pigs in a further effort to determine the relationship of the disease, if any, to infective or spirochetal jaundice. The results were negative. Culture mediums inoculated with blood remained sterile, tests for heavy metals were negative, and no spirochetes could be demonstrated in sections of the liver and kidney impregnated according to the older method of Levaditi. Clinically the disease was divisible into two groups of cases. One group was characterized by jaundice of the conjunctivas preceded by lassitude and digestive disturbances. In the course of a few days jaundice became intense and was accompanied by hemorrhages—epistaxis, hematemesis, melena, hemorrhagic vesicles about the lips and chin and linear or splotchlike extravasations in the skin and visible mucous membranes, those in the skin corresponding to scratch marks, the pressure of bed clothing and other trivial injuries. By this time the patient was languid, drowsy or stuporous or irritable and restless, sometimes irrational. Moderate irregular fever was the rule, and the stools were clay colored. The majority of the patients complained of pains in different localities, and even though stupor was pronounced, signs of tenderness could be elicited by pressure on various parts of the body. In 2 cases epigastric pain and tenderness and vomiting together with jaundice and clay colored stools seemed to point to obstructive disease of the biliary drainage system, and the abdomen was opened, but no obstacle was found to the escape of bile from the common duct. Post mortem, in addition to jaundice and hemorrhages, the disease was attended by cloudy swelling, by dissociation of the parenchyma cells of the liver and foci of necrosis, and by cloudy swelling or necrosis of the tubular epithelium of the kidneys. The second group was marked by wild delirium and rapid death. Postmortem examination showed hemorrhagic and necrotic changes in the liver indistinguishable from those of acute yellow atrophy.

From experience at Bellevue Hospital I am led to the conclusion that there is a form of epidemic hemorrhagic jaundice in which the mortality is high and there is no spirochetal infection, although virus infection cannot be denied and probably exists, and that the disease belongs in the same group as the so-called acute catarrhal jaundice and the epidemic hepatitis observed in more recent years by Dietrich and others in army hospitals.

DOUGLAS SYMMERS, M.D., New York.
General Director of Laboratories, Department of Hospitals, City of New York.

EPIDEMIC HEPATITIS

To the Editor:—The editorial on epidemic hepatitis in THE JOURNAL, November 6, was of considerable interest to me. At Yale the records show that we have had three epidemics of jaundice in the past twenty-two years, the largest, of 119 cases, being in the academic year 1921-22, with 59 cases in 1935-36 and 89 cases in 1938-39. In the 1921-22 epidemic 63 cases had their onset within a fifteen day period in November. In 1935-36 22 cases occurred in January and February and 25 in April and May, and in 1938-39 40 cases occurred in the months of January and February 1939. In the intervening years the incidence has varied between 4 in 1942-43, when our student body was depleted, to 42, with an average of 22 cases a year and a median of 21.

A report of the 1921-22 epidemic was published by Hiscock and Rogers in THE JOURNAL, Feb. 18, 1922. There are great similarities between the disease which we attempted to describe and the clinical picture of epidemic hepatitis as recorded in the editorial referred to. We differ, however, in one respect, for the tender eyeballs and pain on movement which Cameron says are lacking we found in 20 per cent, and subsequent observation has led me to be suspicious of eventful development of jaundice in patients presenting these symptoms. It is often not true, but it has been a guide often enough to keep the suspicion alive.

Our cases in general were milder. The period of hospitalization was shorter and the boys seemed to recover successfully even though the icterus had not disappeared completely when they were discharged. There are variations in the severity of the disease in our group, and in the 1938-39 group a number were able to continue at class throughout their illness. These men had usually had very mild febrile and gastrointestinal symptoms a few days before and came in only after jaundice had developed, when they were apparently starting to feel better.

Those severely involved are pretty sick for a few days, with fevers up to 102 or 103 F., usually becoming normal in three to five days. It is possible, and has happened a number of times, for a man to be discharged from the infirmary with the diagnosis of "grip," go about his business for a day or so, apparently well, and then start having anorexia and nausea and be sent back to the infirmary with jaundice. Such cases have occurred, with the patient sick at home with the initial febrile attack and sent back here as recovered, only to develop the jaundice symptoms after arrival. In the severer cases vomiting, sometimes persistent, is more common than it would appear to be in Cameron's cases.

Frequently the initial febrile period is unaccompanied by any respiratory symptoms or signs. Many patients, however, have some evidence of a respiratory infection at or before the onset of fever or of the gastrointestinal symptoms. We have thought that frequently there was an upswing in the jaundice cases in

periods when colds were particularly prevalent. This seems to be true to this extent: In the years of jaundice epidemics respiratory infection is also unusually prevalent at the same time. The reverse is not true, however, and many months of high incidence of respiratory infection show nothing more than an occasional sporadic case of jaundice.

In epidemic times there are undoubtedly cases of the same malady without icterus. They seemed to be more prevalent as an epidemic period was waning. In all probability there are such cases sporadically, but they are much more difficult, if not impossible, to recognize. There is a definite suggestion of similarity to infantile paralysis in these abortive cases and also in the continued occurrence of sporadic cases with epidemic conditions breaking out at times for reasons which remain obscure.

In the endemic stage, cases appear at long intervals and without any demonstrable relation to previous cases.

The length of the incubation period as stated in the editorial is much longer than the period we thought we found in 1921, namely from three to nineteen days, averaging about a week. Our evidence may not be conclusive, but that was the way it looked to us at the time.

ORVILLE F. ROGERS, M.D.,
Yale University Department of Health,
New Haven, Conn.

POSTURE DURING EXAMINATION OF RAPID HEART

To the Editor:—In the November 13 issue of THE JOURNAL, page 693, there appears a clinical observation on the rapid heart by Dr. L. S. Luton of St. Louis. In this communication Dr. Luton points out that he has been able to reduce the cardiac rate in cases of paroxysmal tachycardias by asking the subject to bend forward to at least a 90 degree angle.

I have also been using this procedure of stimulating the vagus by increasing intrathoracic pressure. Due credit for this observation should be given to Dr. Raymond L. Gregory of the Department of Internal Medicine of the University of Texas School of Medicine at Galveston. He mentioned in his lectures that an attack of paroxysmal tachycardia is frequently stopped completely or noticeably slowed when a patient bends over to tie a shoelace or other such act which involves a comparable change in position.

LOUIS L. FRIEDMAN, M.D., New Orleans.
Medical Resident, L. S. U. Medical School
Division, Charity Hospital.

To the Editor:—I am in receipt of the copy of a letter sent you by Dr. Louis L. Friedman, medical resident, Louisiana State University Medical School, concerning my article "Posture During Examination of Rapid Heart" in the November 13 issue of THE JOURNAL, in which he calls attention to the use of "bending" by Dr. R. L. Gregory of his school to stop a paroxysmal tachycardia attack (treatment).

In my article I specifically excluded this observation as follows: "While this procedure [bending] has been used along with a great many others to influence an attack of paroxysmal tachycardia, a survey . . . did not disclose mention of the use of a 90 degree bend for the specific purpose of slowing the heart as an aid in its examination."

The purpose of my note was to invite the use of "bending" in the examination (not treatment) of rapid hearts of all kinds.

Dorland's Medical Dictionary, edition 19, 1941, describes Erben's reflex as "a slowing down of the pulse upon bending head and trunk strongly forward, said to indicate vagal excitability." Stedman's Medical Dictionary, edition 12, under Erben's phenomenon says "In neurasthenia, if patient squats or bends over far, several slow heart beats occur."

L. S. LUTON, M.D., St. Louis.

HYPERTENSION IN THE MILITARY SERVICE

To the Editor:—In the editorial (THE JOURNAL, November 13, p. 702) titled "Hypertension in Military Service," excessive variability of the normal blood pressure was defined as a heralding sign of subsequent hypertension. It was emphasized that persons who show a transient rise in pressure when exposed to the emotional stress of a physical examination must be regarded as likely candidates for the disease.

Although this assertion may be true for young adults, there is mounting evidence to indicate that "vascular hyperreaction" is a common finding among normal persons over the age of 40. In a recent report on the cold pressor response of 200 normal men between the ages of 40 and 69 years (*Am. Heart J.* **26**:398 [Sept.] 1943) I presented data which strongly suggest that the reactibility of the blood pressure normally increases appreciably with age. An increase in the response of the blood pressure with succeeding decades was observed in "hyporeactors" as well as in "hyperreactors." The incidence of hyperreaction moreover increased with age from 24.2 per cent in the fifth decade to 56.1 per cent in the seventh decade.

These observations indicate that a normal person may show little fluctuation in blood pressure in youth and considerable variability in blood pressure in middle age. Raab, using the stimulus of carbon dioxide inhalation, was among the first to note that the vasopressor response of normal subjects increases with age (*Ztschr. f. klin. Med.* **118**:618, 1931). This rise in response he attributed to a corresponding increase in irritability of the cerebromedullary vasoconstrictor centers with advance of age.

In a study soon to be reported it will be shown that approximately 40 per cent of persons over 40 years of age whose pressures on first examination are below 140/85 are hyperreactors to the cold pressor test. Consequently the theory that such reactibility of the blood pressure per se is a precursor of permanent hypertension must be rejected for this age group. This conclusion appears all the more justified when it is considered that Hines's studies indicate that an initial blood pressure below 140/85 generally means that hypertension will not develop subsequently (THE JOURNAL, July 27, 1940, p. 271).

HENRY I. RUSSEK, M.D.,
U. S. Marine Hospital,
Staten Island, N. Y.

AMPUTATED LIMBS AS SOURCE FOR NERVE GRAFT

To the Editor:—The use of preserved cadaver nerve grafts has been suggested for bridging the gaps left in nerves following trauma or the excision of neuromas (Klemme, R. M.; Woolsey, R. D., and de Rezende, N. T.: Autopsy Nerve Grafts in Peripheral Nerve Surgery, THE JOURNAL, October 16, p. 393). Cadaver material may not always be readily available, and there might be medicolegal repercussions to making special incisions to obtain the grafts. It has occurred to me that a more convenient source of nerve material would be from amputated extremities. Supracondylar amputation of the lower extremity is frequently carried out for dry gangrene or other noninfected lesions of the foot, and good sized pieces of nerve could be obtained and placed in preservative right in the operating room. This would obviate the necessity of "begging" pathologists and relatives for the tissue.

CONRAD R. LAM, M.D.,
Division of General Surgery,
Henry Ford Hospital,
Detroit.

GRADUATE CONTINUATION COURSES FOR PRACTICING PHYSICIANS

COMPILED BY THE COUNCIL ON MEDICAL EDUCATION AND HOSPITALS FOR THE PERIOD JAN. 1, 1944 TO JUNE 30, 1944

Graduate Continuation Courses for Practicing Physicians—Jan. 1, 1944–June 30, 1944

Institution	Schedule of Course	Title of Course	Registration Fee and/or Tuition
ANATOMY			
New York Medical College, Flower and Fifth Avenue Hospitals, 5th Avenue at 105th Street, New York, N. Y.	Arranged. 60 hrs.—Surgical 40 hrs.—Orthopedic	Applied Anatomy: Upper Extremities, including Shoulder, Girdle, Axillae and Mammae	Surgical—$115 Orthopedic— 90
	Arranged. 60 hrs.—Surgical 40 hrs.—Orthopedic	Applied Anatomy: Lower Extremities	Surgical— 115 Orthopedic— 90
	Arranged. 100 hrs.	Thorax, including Axillae and Pectoral Region	200
	Arranged. 160 hrs.	Surgical Anatomy: Head and Neck	275
New York Medical College at William Waldo Blackman Laboratory of Anatomy.	Arranged. 160 hrs.—Either sex 190 hrs.—Both sexes	Abdomen, including Pelvis Pudentum	160 hrs. 295 190 hrs. 370
Columbia University. New York Post-Graduate Medical School, 303 East 20th Street, New York 3, N. Y.	Arranged. 12 sessions	Surgical Anatomy as Applied to Thoracic Surgery (Cadaver)	125
	Arranged. 6 sessions	Surgical Anatomy as Applied to Colon and Rectal Surgery (Cadaver)	75
	Arranged. 12 sessions or more	Dissection and Surgical Anatomy	125
	Arranged. 4 weeks	Surgical Anatomy as Applied to Operative Gynecology (Cadaver)	200
ANESTHESIA			
College of Medical Evangelists, Boyle and Michigan Avenue, Los Angeles.	March 25-April 24. Part time	Anesthesiology	10
Cook County Graduate School of Medicine, 427 South Honore Street, Chicago 12, Illinois.	Arranged. 1 week	Continuous Caudal Anesthesia for Obstetrics	..
Harvard Medical School, 25 Shattuck Street, Boston, Mass.	Arranged. Monthly	Clinical Anesthesia	30
Long Island College of Medicine. Kings County Hospital, 1313 Bedford Ave., Brooklyn, N. Y.	Spring. 22 sessions	Regional anesthesia	75
Columbia University. New York Post-Graduate Medical School, 303 East 20th Street, New York 3, N. Y.	2 weeks, full time, throughout the year	Anesthesia	100
New York Polyclinic Medical School and Hospital, 345 West 50th Street, New York 19, N. Y.	Arranged. 12 sessions	Regional Anesthesia	75
	3 months, full time, Jan. 2-April 1	Regional and Spinal Anesthesia	300
Philadelphia Lying-In Hospital, 8th and Spruce Streets, Philadelphia, Pa.	1 week—offered weekly	Continuous Caudal Analgesia	Arranged
BACTERIOLOGY			
Columbia University. New York Post-Graduate Medical School, 303 East 20th Street, New York 3, N. Y.	Arranged. 1 month	Clinical Bacteriology and Serology	50
	1 month, Spring. Part time	Bacteriological Service in Medicine and Surgery	35
	1 month, Winter and Spring. Full time	Practical Technic of Medical Bacteriology	100
CARCINOMA			
National Cancer Institute, Bethesda, Md. At various hospitals throughout the United States.	Arranged.	Diagnosis and Treatment of Cancer	None
Tufts College Medical School, 30 Bennet Street, Boston, Mass.	Arranged. Throughout the year	Cancer	Arranged
INDUSTRIAL MEDICINE			
Columbia University. New York Post-Graduate Medical School, 303 East 20th Street, New York 3, N. Y.	April 10-14. Full time	Industrial Medicine	35
MEDICINE			
Allergy			
Tufts College Medical School, 30 Bennet Street, Boston, Mass.	May 15-20	Allergy	25
Columbia University. New York Post-Graduate Medical School, 303 East 20th Street, New York 3, N. Y.	Jan. 3, 2 months. Once weekly	Allergy	20
	March 13-31, 3 weeks. Full time	Allergy	150
Vaughan-Graham Clinic, 201 West Franklin Street, Richmond, Va.	1 year. Semiannually by arrangement	Training in Allergy	None
Arthritis			
Columbia University. New York Post-Graduate Medical School, 303 East 20th Street, New York 3, N. Y.	May 1-5. Full time	Arthritis and Allied Rheumatic Disorders	35
	Jan. 3. 2 months, once weekly	Arthritis and Allied Rheumatic Disorders	35

Graduate Continuation Courses for Practicing Physicians—Jan. 1, 1944–June 30, 1944—Continued

Institution	Schedule of Course	Title of Course	Registration Fee and/or Tuition
Cardiology			
College of Medical Evangelists, Boyle and Michigan Avenues, Los Angeles, Calif.	Jan. 12-March 30. 1-2 hr. period per week	Cardiology	$ 24
Tufts College Medical School, 30 Bennet Street, Boston, Mass.	May 1-5	Cardiology	25
Long Island College of Medicine, 350 Henry Street, Brooklyn, N. Y. at Jewish Hospital.	Spring. 5 weeks, part time	Electrocardiography and Clinical Cardiology	20
Long Island College of Medicine, 350 Henry Street, Brooklyn, N. Y. at Israel Zion Hospital.	Spring. 4 sessions, once weekly	Clinical Cardiology	10
Columbia University Faculty of Medicine, 630 West 168th Street, New York, N. Y. at Mt. Sinai Hospital.	Feb. 2-April 26, 12 weeks. Once a week	Advanced Course in Diseases of the Heart	50
	April 3-June 21. Part time	Comprehensive Course in Cardiovascular Diseases	60
Columbia University Faculty of Medicine, 630 West 168th Street, New York, N. Y. at Montefiore Hospital.	Feb. 17-May 25. Part time	Clinical Cardiography	50
Columbia University. New York Post-Graduate Medical School, 303 East 20th Street, New York 3, N. Y.	April 17-21	Cardiology	35
New York Medical College, Flower and Fifth Avenue Hospitals, 5th Avenue at 105th Street, New York, N. Y.	Arranged. 30 hours	Cardiology	100
University of Pennsylvania Graduate School of Medicine, 237 Medical Laboratories, Philadelphia, Pa.	Arranged. 5 days, 30 hours	Electrocardiography and Cardiac Roentgenology	60
Cystoscopy			
Cook County Graduate School of Medicine, 427 South Honore Street, Chicago 12, Illinois.	Ten days. Offered every 2 weeks	Practical Course	..
Diabetes			
Harvard Medical School, 25 Shattuck Street, Boston at New England Deaconess Hospital.	Arranged. Offered continuously	Diabetes	..
Tufts College Medical School, 30 Bennet Street, Boston, Mass.	Jan. 17-22	Diabetes	25
Columbia University. New York Post-Graduate Medical School, 303 East 20th Street, New York 3, N. Y.	May 15-19	Diabetes Mellitus, Nephritis and Hypertension	35
University of Pennsylvania Graduate School of Medicine, 237 Medical Laboratories, Philadelphia, Pa.	Arranged. 2-4 weeks, 75 hours	Diabetes Mellitus	150
Dermatology and Syphilology			
Harvard Medical School, 25 Shattuck Street, Boston, Mass. at Massachusetts General Hospital.	Arranged.	Dermatology Elective: Skin Ward Work	Arranged
	Arranged. 2 months	Clinical Mycology	50
	Spring. 1 month	Occupational Dermatoses	40
	Arranged. 1 year	Dermatology and Syphilology	300
Tufts College Medical School, 30 Bennet Street, Boston, Mass.	Jan. 17-22	Dermatology	25
	May 15-20	Dermatology	25
New York City Department of Health, 125 Worth Street, New York, N. Y.	Arranged.	Dermatology and Syphilology	..
Columbia University. New York Post-Graduate Medical School, 303 East 20th Street, New York 3, N. Y.	6 weeks or 3 months. Part time throughout the year	Clinical Dermatology and Syphilology	6 wks. 40 3 mos. 75
	6 weeks or 3 months. Part time, throughout the year	Practical Instruction in the Diagnosis and Management of Syphilis	6 wks. 40 3 mos. 75
	6 weeks or 3 months. Part time, throughout the year	Diagnosis and Treatment of Syphilis	6 wks. 25 3 mos. 40
	6 weeks or 3 months. Part time, throughout the year	Practical Instruction in Physical Therapy as Applied to Diseases of the Skin	6 wks. 40 3 mos. 75
	3 months, 6 months, 1 year. Part time, throughout the year	Practical Instruction in the Pathological Histology of Diseases of the Skin	3 mos. 75 6 mos. 125 1 yr. 175
	6 weeks or 3 months. Part time, throughout the year	Practical Instruction in Mycology and Animal Parasitology as Related to Diseases of the Skin	6 wks. 40 3 mos. 75
	6 weeks or 3 months. Part time, throughout the year	Practical Instruction in Minor Dermatological Surgery	6 wks. 40 3 mos. 75
	Feb. 7-April 10	Exanthemata and Certain Contagious Diseases	25
	Jan. 6-Feb. 10. Part time	History of Dermatology	10
	May 8-13	Seminar in Practical Dermatology and Syphilology	35
	Feb. 3-March 9. Part time	Industrial Dermatology	10
New York Polyclinic Medical School and Hospital, 345 West 50th Street, New York 19, N. Y.	6 weeks or 3 months. Part time	Dermatology and Syphilology Clinics	6 wks. 50 3 mos. 75
Dietetics			
Tufts College Medical School, 30 Bennet Street, Boston, Mass.	Arranged. Throughout the year	Dietetics	Arranged
Electrocardiography			
Michael Reese Hospital, 29th and Ellis Avenue, Chicago 16, Ill.	Feb. 17-May 4, Part time	Electrocardiographic Interpretation	25
Tufts College Medical School, 30 Bennet Street, Boston, Mass.	Jan. 24-26	Advanced Electrocardiography	20
	May 8-12	Electrocardiography	25
Columbia University Faculty of Medicine, 630 West 168th Street, New York, N. Y. at Mt. Sinai Hospital.	Feb. 4-April 15. Once a week	Advanced Course in Clinical Electrocardiography	35
Columbia University. New York Post-Graduate Medical School, 303 East 20th Street, New York 3, N. Y.	May 22-26. Full time	Electrocardiography	50
New York Medical College, Flower and Fifth Avenue Hospitals, 5th Avenue at 105th Street, New York, N. Y.	Arranged. 15 hours	Electrocardiography	100

Graduate Continuation Courses for Practicing Physicians—Jan. 1, 1944–June 30, 1944—Continued

Institution	Schedule of Course	Title of Course	Registration Fee and/or Tuition
Endocrinology			
College of Medical Evangelists, Boyle and Michigan Avenues, Los Angeles, Calif.	Jan. 14-April 1. 1-2 hr. period per week	Endocrinology	$ 24
Tufts College Medical School, 30 Bennet Street, Boston, Mass.	Spring. 5 days	Endocrinology	25
Columbia University. New York Post-Graduate Medical School, 303 East 20th Street, New York 3, N. Y.	Jan. 3. 2 months Spring	Diseases of the Thyroid and other Endocrine Glands and Nutrition	35
New York Medical College, Flower and Fifth Avenue Hospitals, 5th Avenue at 105th Street, New York, N. Y.	Arranged. 30 hours	Endocrinology	100
Electroencephalography			
University of Pennsylvania Graduate School of Medicine, 237 Medical Laboratories, Philadelphia, Pa.	Arranged. 6 Thursdays, 36 hours	Electroencephalography	150
Gastroenterology			
University of Chicago School of Medicine, 58th and Ellis Avenue, Chicago, Ill.	2 weeks	Gastroscopy	100
Columbia University Faculty of Medicine, 630 West 168th Street, New York, N. Y. at Mt. Sinai Hospital.	April 3-June 21. Part time	Comprehensive course	60
Columbia University. New York Post-Graduate Medical School, 303 East 20th Street, New York 3, N. Y.	Jan. 3. 2 months once weekly	Gastroenterology	35
	Jan. 5-March 29. 12 sessions	Surgery of the Gastrointestinal Tract	150
	March 6-10. Full time	Gastroenterology	35
New York Medical College, Flower and Fifth Avenue Hospitals, 5th Avenue at 105th Street, New York, N. Y.	Arranged. 1 month	Gastroenterology	100
New York Polyclinic Medical School and Hospital, 345 West 50th Street, New York, N. Y.	3 months, Winter, Spring	Clinical Gastroenterology	50
University of Pennsylvania Graduate School of Medicine, 237 Medical Laboratories, Philadelphia, Pa.	16 weeks, 500 hours, Throughout the year	Clinical Gastroenterology	400
Hematology			
Columbia University Faculty of Medicine, 630 West 168th Street, New York, N. Y. at Mt. Sinai Hospital.	March 20-May 11. Part time	Advanced Clinical Hematology	..
New York Medical College, Flower and Fifth Avenue Hospitals, 5th Avenue at 105th Street, New York, N. Y.	Arranged. 30 hours	Physical Diagnosis and Hematology	100
Hypertension and Nephritis			
Long Island College of Medicine, 1313 Bedford Avenue, Brooklyn 2, N. Y. at Jewish Hospital.	Spring. 8 sessions, once weekly	Hypertension and Nephritis	10
Infantile Paralysis			
Georgia Warm Springs Foundation, Warm Springs, Ga.	January and April. One week	Poliomyelitis during Acute and Convalescent Periods	25
Medicine, General			
College of Medical Evangelists, Boyle and Michigan Avenues, Los Angeles, Calif.	Winter. 3 weeks, 6 lectures	Varicose Veins	12
Cook County Graduate School of Medicine, 427 South Honore Street, Chicago 12, Ill.	To be announced in January	Medicine	..
Tulane University School of Medicine, 1430 Tulane Avenue, New Orleans, La.	March	Medicine	..
Maine Medical Association. (Address Dr. F. R. Carter, South Portland)	Arranged	Home Study Course	..
Tufts College Medical School, 30 Bennet Street, Boston, Mass.	May 1-27. Full time	Internal Medicine	50
New York State Department of Health, 130 Worth Avenue, New York, N. Y.	2 months, Winter and Spring. One lecture every fortnight	General Medicine	..
Columbia University Faculty of Medicine, 630 West 168th Street, New York 3, N. Y.	April 24-28. Full time	Peripheral Vascular Diseases	35
Columbia University Faculty of Medicine, 630 West 168th Street, New York, N. Y. at Mt. Sinai Hospital.	Jan. 31-March 25. Part time	General Bedside Therapy	..
Columbia University. New York Post-Graduate Medical School, 303 East 20th Street, New York 3, N. Y.	May 8-12. Full time	Recent Developments in Diagnostic Procedure	35
	Jan. 3. 2 months, daily, full time	Seminar in Internal Medicine	200
	Jan. 3. 2 months, once weekly	Clinical Interpretations of Laboratory Data	25
	Jan. 3. 2 months, once weekly	Problems in Diagnosis	35
	Jan. 3. 2 months, once weekly	Diseases of the Liver and Biliary Tract	25
	Jan. 3. 2 months, part time	Diabetes Mellitus, Nephritis and Hypertension	35
	Jan. 3. 2 months, once weekly	Psychological Aspects of Internal Medicine	20
	Jan. 3. 2 months, once weekly	Peripheral Vascular Diseases	25
	June 12-23. 5 days, 10 days	Symposium on Medicine	5 days 30 10 days 50
	June 5-9. Full time	Pathological Physiology: Functional and Chemical Aspects	35
New York Medical College, Flower and Fifth Avenue Hospitals, 5th Avenue and 105th Street, New York, N. Y.	Arranged, 1 month. (Also 3 years' course for degree)	Medicine	100
New York Polyclinic Medical School and Hospital, 345 West 50th Street, New York 19, N. Y.	Jan. 1-March 31	Course for General Practitioners	6 wks. 100
	April 1-June 30. Full time, 6 weeks or 3 months		3 mos. 150

Graduate Continuation Courses for Practicing Physicians—Jan. 1, 1944–June 30, 1944—Continued

Institution	Schedule of Course	Title of Course	Registration Fee and/or Tuition
Medicine, General—Continued			
Oklahoma State Medical Association, 210 Plaza Court, Oklahoma City.	Arranged. 1 evening a week for 10 weeks	Internal Medicine	$ 6
Philadelphia County Medical Society, 301 South 21st Street, Philadelphia, Pa.	Early in 1944, Annual Postgraduate Institute	Medicine	5
Marquette University School of Medicine, Milwaukee, Wis.	Arranged. Throughout the year	Medical and Surgical Diagnosis	..
Preventive Medicine			
Harvard Medical School, 25 Shattuck Street, Boston, Mass.	Winter, 4 months	Introduction to Epidemiology	Arranged
	Winter, 4 months	Advanced Epidemiology	Arranged
Psychiatry and Neurology			
College of Medical Evangelists, Boyle and Michigan Avenues, Los Angeles, Calif.	April 8-June 10	Medical Psychology	20
Catholic University of America, Washington, D. C. at Child Center.	February-June	Clinical Psychiatry	150
Catholic University of America, Washington, D. C. at St. Elizabeth's Hospital.	Annually. Two semesters	Brain Pathology	300
Institute for Psychoanalysis, 43 East Ohio Street, Chicago 10, Illinois.	Jan. 4-March 21	Psychiatric Case Demonstrations	10
University of Chicago (University College), 18 South Michigan Ave., Chicago.	Jan. 5-March 22	Personality Development in Childhood and Adolescence	30
Michael Reese Hospital, 29th and Ellis Avenue, Chicago, Illinois.	June, 5 days	The Rorschach Test in Milder Mental Disorders	35
The Menninger Clinic, Topeka, Kansas.	1 year. Daily	Psychoanalytic Instruction	Arranged
Topeka Institute for Psychoanalysis, Topeka, Kansas.	Arranged	Short Courses	$10-$100 a month
	12 weeks, part time. Offered continuously	Application of Psychoanalysis to the Study of Psychiatric Problems and of the Psychoses	..
Harvard Medical School, 25 Shattuck Street, Boston, Mass.	Arranged	Research in Neuropathy	Arranged
		Elective: Research on the Cerebrospinal Fluid	
	Arranged	Psychiatry: General Course or Special Fields	Arranged
American Institute for Psychoanalysis, 240 Central Park South, New York, N. Y. at New York Medical College.	Jan. 7-March 10. Weekly seminars	Continuous Case Seminar	12.50
	Feb. 3-April 20. 12 weekly lectures	Integration of Personality in Psychoanalysis	12
	Feb. 1-April 4. 10 weekly lectures	Psychoanalysis and Personnel Relationships	10
	Jan. 3-March 6. 10 weekly seminars	Psychiatry and Psychoanalysis	15
	Jan. 6-April 13. 15 weekly seminars	Readings in Freud	20
	Jan. 4-March 7. 10 weekly seminars	Sex and Neurosis	12.50
	March 20-May 22. 10 weekly seminars	Technic of Dream Interpretation	12.50
Columbia University Faculty of Medicine, 630 West 168th Street, New York, N. Y.	Arranged	Demonstrations in Neuropathology	..
Columbia University. New York Post-Graduate Medical School, 303 East 20th Street, New York 3, N. Y.	Jan.-May. 1 month or longer, part time	Clinical Neurology	50
	Feb. 2-April 26. Part time	Psychoanalysis in General Medicine	35
	Feb. 2-May 17. 16 sessions, once weekly	Review of Fundamentals of Neurology and Psychiatry	75
	March 6-10.	Neurology and Psychiatry in Childhood	35
	March 3-7.	Neurological Diagnosis and Treatment in General Practice	35
New York Medical College, Flower and Fifth Avenue Hospitals, Fifth Avenue at 105th Street, New York, N. Y.	Spring. 10 hours	Seminar on Sex and Neuroses	20
University of Pennsylvania Gradute School of Medicine, 237 Medical Laboratories, Philadelphia, Pa.	Arranged. 8 weeks, 240 hours	Clinical Psychiatry	160
	Arranged. 10 weeks, 250 hours	Clinicobiologic Neurology and Psychiatry	100
Tuberculosis			
California Tuberculosis Association, 45 Second Street, San Francisco, Calif.	Arranged. 1 week	Intensive Course	None
	Arranged. 1 day to 1 week	Diseases of the Chest	None
Mississippi State Sanatorium, Sanatorium, Miss.	Arranged. 2 weeks or more	Clinical Medicine and Chest Diseases	None
Columbia University. New York Post-Gradute Medical School, 303 East 20th Street, New York, N. Y.	Spring. 2 months once a week, part time	Acute and Chronic Diseases of the Chest	35
New York Medical College, Flower and Fifth Avenue Hospitals, 5th Avenue at 105th Street, New York, N. Y.	Arranged. 1 month	Clinical Pulmonary Diseases	100
State Tuberculosis Sanatorium, Sanatorium, Texas	14 days. Throughout the year	Diseases of the Chest	None
Venereal Disease Control			
United States Public Health Service, Hot Springs National Park, Arkansas.	4 weeks. Repeated at intervals	Management and Control of Venereal Diseases	None
New York City Department of Health, 125 Worth Street, New York, N. Y.	Optional. Throughout the year	Diagnosis and Treatment of Venereal Diseases	None
Institute for the Control of Syphilis, University of Pennsylvania Hospital, 3400 Spruce Street, Philadelphia, Pa.	Arranged. 6 sessions of 4 hours	Basic Training Course in Venereal Disease Control	30
	Arranged. 15 days	Venereal Disease Control for Public Health Officers	None
	Arranged. 10 days for Army medical officers	Intensive Training Course in Venereal Disease Control	None

Graduate Continuation Courses for Practicing Physicians—Jan. 1, 1944–June 30, 1944—Continued

Institution	Schedule of Course	Title of Course	Registration Fee and/or Tuition
MILITARY MEDICINE			
Bureau of Medicine and Surgery, Navy Department, Washington, D. C.	9 weeks—throughout year	Basic Instruction	None
	3 to 6 months—throughout year	X-Ray	None
	8 weeks, periodically	Venereal Disease Control	$100
	1 year, periodically	Urology	None
	3 weeks—throughout year	Tropical Medicine	17.50
	2 to 6 months—throughout year	Surgery—General, Maxillofacial, Neuro, Oral, Orthopedic, Plastic and Reconstructive, Thoracic, Traumatic and Genitourinary	None
	6 months—throughout year	Anesthesia	None
	8 weeks—throughout year	Aviation Medical Examiner	None
	3 to 4 weeks—throughout year	Blood Plasma	None
	1 month—throughout the year	Chemical Warfare	None
	3 to 6 months—throughout year	Deep Diving	None
	6 months—throughout year	Epidemiology and Laboratory Procedures	None
	5 months—throughout year	Flight Surgeon	None
	3 months—throughout year	General Medicine	None
	12 weeks—periodically	Industrial Hygiene	200
	3 to 6 months—throughout year	Internal Medicine	None
	2 to 4 months—throughout year	Malariology	None
	6 months—throughout year	Naval Aviator	None
	9 months—throughout year	Obstetrics and Gynecology	None
	6 months—throughout year	Ophthalmology and Otolaryngology	None
	3 months—throughout year	Parachute Jumping	None
	1 to 5 months—throughout year	Pathology	None
	6 months—throughout year	Physical and Fever Therapy	None
	2 to 9 months—throughout year	Psychiatry	None
OBSTETRICS AND GYNECOLOGY			
Cook County Graduate School of Medicine, 427 South Honore Street, Chicago 12, Ill.	Feb. 21. 2 weeks	Obstetrics	..
	Feb. 7. 2 weeks	Gynecology	..
University of Illinois College of Medicine, 1853 West Polk Street, Chicago, Ill.	Arranged. 2 weeks	Obstetrics and Pediatrics	..
Chicago Maternity Center, 1336 Newberry Avenue, Chicago, Ill.	January and May. 4 months	Practical Obstetrics	10
Louisiana State University School of Medicine, 1542 Tulane Avenue, New Orleans, La.	Spring. 2 weeks full time	Obstetrics	None
Tulane University of Louisiana School of Medicine, 1430 Tulane Avenue, New Orleans, La.	Arranged. April	Obstetrics and Gynecology	..
Maine Medical Association. (Address Dr. F. R. Carter, South Portland)	Arranged	Home Study Course	None
Harvard Medical School, 25 Shattuck Street, Boston, Mass.	Monthly. 10 exercises	Gonorrhea in Women	20
	1 month or more	Clinical Obstetrics	125
	June. 1 month or more	Gynecology	75
Columbia University Faculty of Medicine, 630 West 168th Street, New York 32, N. Y. at Margaret Hague Maternity Hospital.	1 month. Monthly	Obstetrics, Observation Course	100
Columbia University. New York Post-Graduate Medical School, 303 East 20th Street, New York 3, N. Y.	Arranged. 10 or 15 sessions, part time throughout the year	Diagnosis and Office Treatment	10 sessions 40; 15 sessions 60
	Arranged. 15 sessions, part time, throughout the year	Cystoscopy and Endoscopy	75
	April 10-15, June 5-10. Full time	Symposium on Recent Advances in Gynecology	50
	Arranged. 8 weeks, part time, 24 sessions	Gynecological Endocrinology	100
	Arranged. Part time	Gynecological Pathology	Arranged
	Jan. 3, April 3. 1, 2 or 3 months, full time	Seminar in Gynecology	1 mo. 125; 2 mos. 225; 3 mos. 300
New York Medical College, Flower and Fifth Avenue Hospitals, 5th Avenue at 105th Street, New York, N. Y.	Arranged. 160 hours	Applied Anatomy of Pelvis and Abdomen	295
New York Polyclinic Medical School and Hospital, 345 West 50th Street, New York 19, N. Y.	Spring. 2 months, full time	Obstetrics and Gynecology	250
PATHOLOGY			
Harvard Medical School, 25 Shattuck Street, Boston, Mass.	1 month. Monthly and weekly, January through May	Pathology of Obstetrics and Gynecology	1 mo. 125
Columbia University Faculty of Medicine, 630 West 168th Street, New York 32, N. Y. at Mt. Sinai Hospital.	Feb. 1-April 12. Part time	General and Special Pathology	45
	April 19-June 24. Part time	Surgical Pathology	45
Columbia University. New York Post-Graduate Medical School, 303 East 20th Street, New York 3, N. Y.	Jan. 18-April 27. 2 sessions weekly	Surgical Pathology	125
	April 12-May 26. Part time	Gross and Microscopic Pathology	50
	March 1-27. Part time	Pathology of the Blood and Blood-Forming Organs	75

Graduate Continuation Courses for Practicing Physicians—Jan. 1, 1944–June 30, 1944—Continued

Institution	Schedule of Course	Title of Course	Registration Fee and/or Tuition
Pathology—Continued			
New York Eye and Ear Infirmary, 218 Second Avenue, New York, N. Y.	January-March. 3 months	Histopathology of the Eye	$85
New York Polyclinic Medical School and Hospital, 345 West 50th Street, New York 19, N. Y.	Arranged	Pathology and Bacteriology	Arranged
PEDIATRICS			
University of Illinois College of Medicine, 1853 West Polk Street, Chicago, Ill.	Arranged. 2 weeks	Obstetrics and Pediatrics	None
Tulane University of Louisiana School of Medicine, 1430 Tulane Avenue, New Orleans.	Jan. 24-27, May	Pediatrics	..
Maine Medical Association (Address Dr. F. R. Carter, South Portland)	Arranged	Home Study Course	None
Tufts College Medical School, 30 Bennet Street, Boston, Mass.	Jan. 3-29	Pediatrics	50
Long Island College of Medicine, 350 Henry Street, Brooklyn, N. Y. at Beth El Hospital.	Spring. 10 sessions twice weekly	Diseases of Children	10
Long Island College of Medicine, 350 Henry Street, Brooklyn, N. Y. at Long Island College Hospital.	Spring. 8 sessions once weekly	Endocrine Diseases in Children	10
Columbia University. New York Post-Graduate Medical School, 303 East 20th Street, New York 3, N. Y.	March 13-18. Full time	Symposium on Recent Advances in Pediatrics	35
New York Polyclinic Medical School and Hospital, 345 West 50th Street, New York 19, N. Y.	Arranged. 4 weeks, part time	Pediatrics	50
PHYSICAL THERAPY			
Northwestern University Medical School, 303 East Chicago Avenue, Chicago, Ill.	12 weeks for Latin American students. 1 to 3 month courses arranged for Army, Navy and Civilian Physicians	Physiotherapy	Civilians 200 Others None
Columbia University. New York Post-Graduate Medical School, 303 East 20th Street, New York 3, N. Y.	March 20-24. Full time	Physical Therapy	35
New York Polyclinic Medical School and Hospital, 345 West 50th Street, New York 19, N. Y.	Winter, Spring. 4 weeks, part time	Physical Therapy	100
PUBLIC HEALTH			
Albany Medical College, 47 New Scotland Avenue, Albany, N. Y.	Arranged. 1 year	Extension Course in Public Health Qualifying for Grade II Health Officer	30
State of New York Department of Health, Albany, N. Y.	6 months field training in school of public health, offered continuously	Public Health	..
RADIOLOGY			
Cook County Graduate School of Medicine, 427 South Honore Street, Chicago 12, Ill.	Weekly	Courses in X-Ray Interpretation. Fluoroscopy, and Deep X-Ray Therapy	..
Harvard Medical School, 25 Shattuck Street, Boston, Mass.	One month. Monthly	General Roentgenology (3 courses offered at various hospitals)	50 100
	One month. Monthly	Roentgenology in Diseases of the Eye, Ear and Accessory Sinuses	35
Tufts College Medical School, 30 Bennet Street, Boston, Mass.	Jan. 10-13	Radiology	25
Long Island College of Medicine, 350 Henry Street, Brooklyn, N. Y.	Spring. 8 sessions, once weekly	Cardiovascular Roentgenology	10
Columbia University Faculty of Medicine, 630 West 168th Street, New York 32, N. Y. at Montefiore Hospital.	Jan. 11-Feb. 29, March 13-May 1, part time	Roentgenology of the Gastro-Intestinal Tract	35
Columbia University Faculty of Medicine, 630 West 168th Street, New York 32, N. Y. at Presbyterian Hospital.	Jan. 12. Sixteen one hour lectures	Radiological Physics Practicing physicians Hospital residents	50 15
New York Eye and Ear Infirmary, 218 Second Avenue, New York, N. Y.	Arranged. 6 weeks, monthly	Ophthalmic and Otologic Roentgenology	40
New York Medical College, Flower and Fifth Avenue Hospitals, 5th Avenue at 105th Street, New York, N. Y.	Arranged. 2 months	Radiology	150
New York Polyclinic Medical School and Hospital, 345 West 50th Street, New York 19, N. Y.	6 weeks or 3 months. offered monthly	Practical Roentgenological Interpretation and Technic	6 wks. 150 3 mos. 300
	6 weeks or 3 months. Monthly	Diagnostic Roentgenology and Radiotherapy	6 wks. 150 3 mos. 300
SURGERY			
Fractures			
Long Island College of Medicine, 350 Henry Street, Brooklyn, N. Y.	Spring. 10 sessions, once weekly	Fractures	10
Cook County Graduate School of Medicine, 427 South Honore Street, Chicago 12, Ill.	To be announced in January	Fractures	..
Gastroscopy			
Columbia University Faculty of Medicine, 630 West 168th Street, New York 32, N. Y. at Presbyterian Hospital.	Arranged. 2 months	Gastroscopy	200
Columbia University. New York Post-Graduate Medical School, 303 East 20th Street, New York 3, N. Y.	Arranged. Spring	Gastroscopy	75
New York Medical College, Flower and Fifth Avenue Hospitals, 5th Avenue at 105th Street, New York, N. Y.	Arranged. 10 sessions (or more)	Gastroscopy	100
Ophthalmology			
Children's Memorial Hospital, 707 Fullerton Avenue, Chicago 14, Ill.	Winter, Spring. 6 days	Neuro-Muscular Anomalies of the Eyes from Neurologic Viewpoint	50
Cook County Graduate School of Medicine, 427 South Honore Street, Chicago 12, Ill.	Arranged	Clinical Course	..
University of Illinois College of Medicine, 1853 West Polk Street, Chicago, Ill.	Winter, Spring. 9 months, part time	Ophthalmology	150
Tufts College Medical School, 30 Bennet Street, Boston, Mass.	Arranged. 3 mornings a week for 1 month	Ophthalmology	50
Long Island College of Medicine, 350 Henry Street, Brooklyn, N. Y.	Spring. 6 sessions daily	Basic and Clinical Ophthalmology	20

Graduate Continuation Courses for Practicing Physicians—Jan. 1, 1944–June 30, 1944—Continued

Institution	Schedule of Course	Title of Course	Registration Fee and/or Tuition
Ophthalmology—Continued			
New York Eye and Ear Infirmary, 218 Second Avenue, New York, N. Y.	Arranged. 1 month, offered monthly	External Diseases of the Eyes	$ 40
	Arranged. 1 month, offered monthly	Ophthalmoscopy	40
	January, April. 3 months	Refraction	100
	Arranged. 1 month, offered monthly	Anomalies of the Ocular Muscles	40
	Spring. 1 week	Intensive Refresher Course in Ophthalmology and Otology	50
	Winter. 6 months	Ophthalmology and Otology	900
	Arranged. 1 month, offered monthly	Perimetry	40
	Arranged. 1 month, offered monthly	Operative Surgery of the Eye	75
	Arranged. 1 month, offered monthly	Slit Lamp Course	50
	Arranged. 1 month or more, offered monthly	Bacteriology of the Eye	40
	Arranged. 1 month, offered monthly	Ocular Therapy	40
	Arranged. 2 months	Physiological Optics	65
	Arranged. 1 month, offered monthly	Plastic Eye Surgery	75
	Arranged. 1 to 3 months, part time, offered monthly	General Course	1 mo. 40 3 mos. 100
Columbia University Faculty of Medicine, 630 West 168th Street, New York 32, N. Y. at Montefiore Hospital.	Feb. 3-March 20. Part time	Ophthalmoscopy	25
Columbia University. New York Post-Graduate Medical School and Hospital, 303 East 20th Street, New York 3, N. Y.	Arranged. 15 sessions, part time	Embryology, Histology and Pathology of the Eye	75
	March 6-11. Full time	Motor Anomalies of the Eye	60
	March 20-25. Part time	Surgery of the Eye	75
	March 27-31	Slit Lamp Diagnosis	35
	March 13-17	Anomalies of the Ocular Muscles	50
New York Polyclinic Medical School and Hospital, 345 West 50th Street, New York 19, N. Y.	Winter, Spring. 6 weeks, part time	Refraction	100
	Winter, Spring. 6 weeks, part time	Clinical Eye Course	50
	Winter, Spring. 3 months, part time	Clinical and Operative Course (Cadaver) Refraction	275
University of Pennsylvania Graduate School of Medicine, 237 Medical Laboratories, Philadelphia, Pa.	Arranged. 8 weeks, 120 hours	Ocular Refraction	270
	Arranged. 8 weeks, 16 hours	Ophthalmic Histology and Pathology	200
Ophthalmology and Otolaryngology			
Research Study Club of Los Angeles. (Address Dr. Harold F. Whalman, 727 West 7th Street, Los Angeles, Calif.)	Jan. 17-28	Annual Mid Winter Post-graduate Course Civilians Army and Navy officers	50 25
	Arranged	Special Course in Applied Anatomy and Cadaver Surgery of Head and Neck	50
Gill Memorial Eye, Ear and Throat Hospital, 711 South Jefferson Street, Roanoke, Va.	April 3. 18th Annual Spring Graduate Course	Ophthalmology and Otolaryngology	50
Otolaryngology			
Cook County Graduate School of Medicine, 427 South Honore Street, Chicago 12, Ill.	Arranged	Special and Clinical Courses	..
University of Illinois College of Medicine, 1853 West Polk Street, Chicago, Ill.	Winter, Spring. 9 months	Otolaryngology	300
	Winter. 5 days, full time	Refresher Course	50
Indiana University Medical Center, Indianapolis, Ind.	Spring. 2 weeks	Otolaryngology	150
Harvard Medical School, 25 Shattuck Street, Boston, Mass.	Arranged. 5 exercises	Technic of Submucous Resection of the Nasal Septum	75
	1 month. Monthly	Clinical Otology	50
Tufts College Medical School, 30 Bennet Street, Boston, Mass.	Monthly. 3 or 5 mornings a week	Otolaryngology	30 or 50
Columbia University. New York Post-Graduate Medical School and Hospital, 303 East 20th Street, New York 3, N. Y.	Arranged. 4 weeks or more part time, throughout the year	Diagnostic Procedures	1 section 30 2 sections 50
	Arranged	Surgical Anatomy as Applied to Otology (Cadaver)	Arranged
	Arranged. Jan.-June	Surgical Anatomy as Applied to Rhinology and Laryngology (Cadaver)	Arranged
	Arranged. Jan.-June	Dissection of the Head and Neck	Arranged
	Arranged. 15 sessions or more	Embryology, Histology and Pathology of the Ear, Nose and Throat	Arranged
New York Eye and Ear Infirmary, 218 Second Avenue, New York, N. Y.	1 month. Monthly	Clinical Otology	40
	1 month. Monthly	Operative Surgery of the Ear and Nasal Accessory Sinuses (Cadaver)	110
	4 weeks. Monthly	Anatomy of the Ear	45
	1 month or more. Monthly	Bacteriology of the Ear	40
	January-May. 2 or 6 weeks, offered monthly	Broncho-Esophagology	250
New York Medical College, Flower and Fifth Avenue Hospitals, 5th Avenue at 105th Street, New York, N. Y.	Arranged. 80 hours	Applied Anatomy of Ear, Nose and Throat	165
New York Polyclinic Medical School and Hospital, 345 West 50th Street, New York 19, N. Y.	Winter, Spring. 3 months, full time	Clinical and Operative Refraction	600
	Winter, Spring. 6 weeks, full time	Clinical Course	100
	Winter, Spring. 6 weeks, part time	Clinical Course	75
	Winter, Spring. 2 months	Advanced Otology	250

Graduate Continuation Courses for Practicing Physicians—Jan. 1, 1944–June 30, 1944—Continued

Institution	Schedule of Course	Title of Course	Registration Fee and/or Tuition
Otolaryngology—Continued			
University of Pennsylvania Graduate School of Medicine, 237 Medical Laboratories, Philadelphia, Pa.	Arranged. 2 weeks, 85 hours	Broncho-Esophagology, Gastroscopy, and Laryngeal Surgery	$250
	Arranged. 2 weeks, 20 hours	Otologic Operations (Cadaver)	100
	Arranged. 10 days, 20 hours	Rhinolaryngologic Operations (Cadaver)	150
Orthopedic Surgery			
Harvard Medical School, 25 Shattuck Street, Boston, Mass.	1 month. Monthly	Clinical Orthopedic Surgery	50
Tufts College Medical School, 30 Bennet Street, Boston, Mass.	Feb. 28-March 4	Diseases of the Bone and Joints	25
Columbia University. New York Post-Graduate Medical School and Hospital, 303 East 20th Street, New York 3, N. Y.	Jan. 24-Feb. 4. Full time	Seminar	90
	April 24-29. Full time	Orthopedics in General Practice	35
	May 1-June 1	Functional Anatomy in Relation to Orthopedics	40
Plastic Surgery			
New York Polyclinic Medical School and Hospital, 345 West 50th Street, New York 19, N. Y.	Winter, Spring. 4 weeks, full time	Plastic Reparative Surgery	250
Proctology			
College of Medical Evangelists, Boyle and Michigan Avenues, Los Angeles, Calif.	Winter. 1 month; 10 periods, 2 hrs. each, 2 each week	Proctology	40
Tufts College Medical School, 30 Bennet Street, Boston, Mass.	April 24-29	Proctology	25
	May 1-26	Proctology	2 wks., $50; 4 wks. 100
Long Island College of Medicine, 350 Henry Street, Brooklyn, N. Y.	Spring. 3 weeks	Proctology	25
New York Polyclinic Medical School and Hospital, 345 West 50th Street, New York 19, N. Y.	Spring. 6 weeks, part time	Proctology and Gastroenterology	100
	Winter, Spring. 6 weeks, part time	Proctology, Gastroenterology and Allied Subjects with Operative Proctology (Cadaver)	200
	Winter, Spring. 10 sessions	Operative Proctology (Cadaver)	100
	Winter, Spring. 6 weeks, part time	Clinical Proctology, Medical and Operative	75
Surgery			
Cook County Graduate School of Medicine, 427 South Honore Street, Chicago 12, Ill.	2 weeks throughout the year	Surgery	..
Tulane University of Louisiana School of Medicine, 1430 Tulane Avenue, New Orleans, La.	Feb. 21-26.	Surgery	..
Maine Medical Association. (Address Dr. F. R. Carter, South Portland)	Arranged	Home Study Course	None
Harvard Medical School, 25 Shattuck Street, Boston, Mass.	Spring. 1 month, part time	Surgery for Children	50
Tufts College Medical School, 30 Bennet Street, Boston, Mass.	Spring. 2 weeks	Surgery	150
Columbia University. New York Post-Graduate Medical School, 303 East 20th Street, New York 3, N. Y.	Jan. 5-March 29. 12 sessions, 4 hours each, once weekly	Surgery of the Gastrointestinal Tract	150
	Arranged. 8 sessions, part time	Blood Transfusion; Blood and Plasma Bank	35
	Jan.-June. 12 sessions, part time	Surgical Anatomy as Applied to Thoracic Surgery (Cadaver)	125
	Arranged. 5 sessions part time Jan.-June	Surgical Anatomy as Applied to Colon and Rectal Surgery (Cadaver)	75
	Jan.-June. 12 sessions or more, part time	Dissection and Surgical Anatomy	125
New York Medical College, Flower and Fifth Avenue Hospitals, 5th Avenue at 105th Street, New York, N. Y.	Arranged. 52 hours	Surgical Technic	375
	Arranged. 30 hours	Peritoneoscopy	75
New York Polyclinic Medical School and Hospital, 345 West 50th Street, New York 19, N. Y.	Winter, Spring. 3 months, full time	Combined Surgical Course	350
	Winter, Spring. 6 weeks, full time	Operative Clinic and Lecture Course	100
Traumatic Surgery			
College of Medical Evangelists, Boyle and Michigan Avenues, Los Angeles, Calif.	March 10-May 12. 1-2 hour period a week	Traumatic Surgery	20
Cook County Graduate School of Medicine, 427 South Honore Street, Chicago 12, Ill.	To be announced in January	Traumatic Surgery	..
Columbia University. New York Post-Graduate Medical School, 303 East 20th Street, New York 3, N. Y.	March 13-18, June 26-July 1. 6 days, full time	Diagnosis and Treatment of Trauma	35
	May 1-12. Full time	Seminar	90
Urology			
College of Medical Evangelists, Boyle and Michigan Avenues, Los Angeles, Calif.	March 17-April 28. 1 period a week	Urology	12
Cook County Graduate School of Medicine, 427 South Honore Street, Chicago 12, Ill.	2 weeks, 1 month. Offered every 2 weeks	Urology	..
Long Island College of Medicine, 350 Henry Street, Brooklyn, N. Y.	1 month or more. Part time, monthly	Urology	25
Columbia University. New York Post-Graduate Medical School, 303 East 20th Street, New York 3, N. Y.	Feb. 7-19-May 15-27. Part time	Urological Diagnosis in General Practice	40
	Jan. 17-21, March 6-10, May 22-26	Recent Advances in Urology	60
University of Pennsylvania Graduate School of Medicine, 237 Medical Laboratories, Philadelphia, Pa.	Arranged. 6 weeks, 36 hours	Cystoscopy, Chromoureteroscopy and Pyelography	300
VARIOUS COURSES			
Maine Medical Association. (Address Dr. F. R. Carter, South Portland)	Arranged. 1 to 2 months	Short Courses in Medicine, Minor Surgery, etc.	None

Medical Examinations and Licensure

COMING EXAMINATIONS AND MEETINGS

BOARDS OF MEDICAL EXAMINERS
BOARDS OF EXAMINERS IN THE BASIC SCIENCES

Examinations of boards of medical examiners and boards of examiners in the basic sciences were published in THE JOURNAL, Dec. 11, page 991.

NATIONAL BOARD OF MEDICAL EXAMINERS

NATIONAL BOARD OF MEDICAL EXAMINERS: *Parts I and II.* Jan. 17-19. *Part III.* Various centers, January. Sec., Dr. J. S. Rodman, 225 S. 15th St., Philadelphia.

EXAMINING BOARDS IN SPECIALTIES

AMERICAN BOARD OF ANESTHESIOLOGY: *Oral. Part II.* Chicago, June 12-16. Final date for filing application is March 12. Sec., Dr. Paul M. Wood, 745 Fifth Ave., New York.

AMERICAN BOARD OF DERMATOLOGY AND SYPHILOLOGY: *Written,* Various large cities, May 8. *Oral.* Chicago, June 9-10. Final date for filing application is April 1. Sec., Dr. C. Guy Lane, 416 Marlboro St., Boston.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY: *Part II.* May or June. Sec., Dr. Paul Titus, 1015 Highland Bldg., Pittsburgh 6, Pa.

AMERICAN BOARD OF OPHTHALMOLOGY: Chicago, October. Sec., Dr. John Green, 6830 Waterman Ave., St. Louis.

AMERICAN BOARD OF ORTHOPAEDIC SURGERY: *Written and Oral. Part II.* Chicago, Jan. 21-22. Sec., Dr. Guy A. Caldwell, 3503 Prytania St., New Orleans, La.

AMERICAN BOARD OF OTOLARYNGOLOGY: *Oral.* Los Angeles, Feb. 2-5. Sec., Dr. Dean M. Lierle, University Hospitals, Iowa City, Ia.

AMERICAN BOARD OF PEDIATRICS: *Written.* Locally, Feb. 4. *Oral.* Philadelphia, March 25-26, and San Francisco, May 6-7. Sec., Dr. C. A. Aldrich, 707 Fullerton Ave., Chicago.

AMERICAN BOARD OF PSYCHIATRY AND NEUROLOGY: *Oral.* Locally, Dec. 20-21. Sec., Dr. Walter Freeman, 1028 Connecticut Ave. N.W., Washington, D. C.

AMERICAN BOARD OF SURGERY: *Written. Part I.* March 10. Final date for filing application is Jan. 1. Sec., Dr. J. Stewart Rodman, 225 S. 15th St., Philadelphia.

AMERICAN BOARD OF UROLOGY: *Oral.* Chicago, Feb. 15-17. Sec., Dr. Gilbert J. Thomas, 1409 Willow St., Minneapolis.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Federal Income Taxes: Fees for Attorneys' Services Which Temporarily Enabled Continuance of Illegal Practice an "Ordinary and Necessary Expense of Carrying on Trade or Business."—Heininger practiced dentistry in absentia by mail. Apparently without seeing his so-called patients he undertook to make and supply false teeth. The post office department found in appropriate proceedings that his methods were fraudulent and an order denying him the use of the mails was issued. Subsequently he sued the postmaster general in the district court for the District of Columbia, which enjoined the postmaster from enforcing the fraud order. On appeal the circuit court of appeals for the District of Columbia reversed the judgment of the district court and the fraud order of the post office department was sustained. In the defense of his business in the proceedings before the post office department and in the district and appellate courts Heininger incurred and paid several thousand dollars for attorneys' fees and expenses. The net effect of the services rendered by the attorneys was to prevent the enforcement of the fraud order during 1937 and 1938, during which years Heininger continued in business and received large gross incomes. In computing his federal income tax Heininger sought to deduct from his gross income for 1937 and for 1938, as an ordinary and necessary expense of carrying on that business, the attorneys' fees and expenses of the literature.

In this respect the internal revenue code, section 23, provides, in part, as follows:

"In computing net income there shall be allowed as deductions:
"(a) Expenses.
"(1) In general.
"All the ordinary and necessary expenses paid or incurred during the taxable year in carrying on any trade or business. . . ."

The commissioner of internal revenue disallowed the deduction, and the board of tax appeals affirmed the determination of the commissioner. Heininger then appealed to the circuit court of appeals, seventh circuit.

The question is, said the circuit court of appeals, whether or not such expenses are deductible as ordinary and necessary expenses in carrying on Heininger's business within the meaning of the section quoted in the footnote. What is an ordinary expense is discussed by Mr. Justice Cardozo in *Welch* v. *Helvering,* 290 U. S. 111, 54 S. Ct. 8, 78 L. Ed. 212, as follows:

Ordinary in this context does not mean that the payments must be habitual or normal in the sense that the same taxpayer will have to make them often. A lawsuit affecting the safety of a business may happen once in a lifetime. The counsel fees may be so heavy that repetition is unlikely. None the less, the expense is an ordinary one because we know from experience that payments for such a purpose, whether the amount is large or small, are the common and accepted means of defense against attack.

By this standard, we think it plain that the expense in this case was ordinary. It was such an expense as related strictly to the life of the business. Not only, however, the court continued, must the expense be ordinary, it must also be necessary. In *Kornhauser* v. *United States,* 276 U. S. 145, 48 S. Ct. 219, 72 L. Ed. 505, Mr. Justice Sutherland, in discussing the allowance, as a deduction, of attorneys' fees as a business expense, said:

. . . where a suit or action against a taxpayer is directly connected with, or, as otherwise stated, . . . proximately resulted from, his business, the expense incurred is a business expense within the meaning . . . of the act.

We think that where an expense is incurred which saves the life of a business, even for a time, it is, in the light of the foregoing interpretation, not only a business expense but a necessary business expense. Without the expenditure there would have been no income in this case because there would have been no business. The business depended on the expense incurred in the litigation. Obviously, therefore, the expense was both ordinary and necessary. If the expense in this case was not an ordinary and necessary expense to the "carrying on" of the business, we are unable to understand the English language. Without this expense there would have been no business. Without the business there would have been no income. Without the income there would have been no tax. To say that this expense is not ordinary and necessary is to say that that which gives life is not ordinary and necessary.

The judgment of the board of tax appeals affirming the commissioner's determination was accordingly reversed and the expenses of the attorneys' fees was allowed to be deducted from the gross income of Heininger during the two years in question. —*Heininger v. Commissioner of Internal Revenue, 133 F. (2d) 567 (1943).*

Society Proceedings

COMING MEETINGS

Annual Forum on Allergy, St. Louis, Jan. 22-23. Dr. Jonathan Forman, 394 East Town St., Columbus, Ohio.

Society of Surgeons of New Jersey, Atlantic City, January 29. Dr. Walter B. Mount, 21 Plymouth St., Montclair, N. J., Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1933 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American J. Digestive Diseases, Fort Wayne, Ind.

10:319-364 (Sept.) 1943

*Chronic Peptic Ulceration of Esophagus. E. E. Cleaver.—p. 319.
Leiomyosarcoma of Stomach: Presenting 4 Cases. A. Bassler.—p. 342.
Proteus Vulgaris and Proteus Morganii in Diarrheal Disease of Infants. E. R. Neter and R. H. Farrar.—p. 344.
Colloidal Gold Reaction of Blood Serum in Hepatic and Other Diseases. P. H. Noth and E. R. Loew.—p. 348.
Primary Constipation: Treatment. D. C. Ditmore.—p. 356.

Chronic Peptic Ulceration of Esophagus. — Cleaver reports 10 cases of peptic ulcer of the esophagus that were observed at the Toronto General Hospital. Five of the patients were men and 5 were women. Their ages varied between 30 and 79. The condition is not rare. It presents a definite clinical picture and positive roentgenologic aspects. It is nearly always associated with a congenitally short esophagus and a diaphragmatic hernia which permits regurgitation of the acid contents of the stomach into the esophagus. In 1 case the acid secretion of ectopic gastric mucosa was the probable cause in the development of esophageal ulcer. Peptic ulcer of the esophagus responds to adequate treatment. When roentgenoscopy fails to show a diaphragmatic hernia and a short esophagus but biopsy shows an ectopic gastric mucosa, the treatment of the ulcer is the same as for gastric and duodenal ulcer, but when roentgenoscopy reveals a diaphragmatic hernia and a short esophagus the esophageal ulcer will be in contact with the acid contents of the stomach at certain times. Fluids and semisolids should be taken at two or three hour intervals. Hot or cold fluids should be avoided. Solids generally cause discomfort and pain. The patient is more comfortable in the sitting posture. Tincture of belladonna should be given fifteen to twenty minutes before each feeding. A tablespoon of liquid petrolatum should be taken before each meal. Feeding by duodenal tube is very satisfactory. Six or seven feedings of milk, orange juice, liver extract, corn syrup and ascorbic acid should be given in twenty-four hours. Dilation of the esophagus must be resorted to if the patient presents difficulty in swallowing after three weeks of duodenal feeding.

American Journal of Diseases of Children, Chicago

66:349-470 (Oct.) 1943

Long Term Prevention of Tooth Decay Among Diabetic Children. J. D. Boyd.—p. 349.
*Ingestion of Fluoride and Dental Caries: Quantitative Relations Based on Food and Water Requirements of Children One to Twelve Years Old. F. J. McClure.—p. 362.
Pancreatic Function and Disease in Early Life: II. Effect of Secretion on Pancreatic Function of Infants and Children. Charlotte L. Maddock, S. Farber and H. Shwachman.—p. 370.
Effects of Disease on Nutrition: I. Absorption, Storage and Utilization of Vitamin A in Presence of Disease. S. Spector, C. F. McKhann and Emily R. Meserve.—p. 376.
Effect of Adolescence on Basal Metabolism of Normal Children. R. C. Lewis, Anna Marie Duval and A. Iliff.—p. 396.
Pancreatic Function and Disease in Early Life: III. Methods of Analyzing Pancreatic Enzyme Activity. H. Shwachman, S. Farber and Charlotte L Maddock—p 418

Ingestion of Fluoride and Dental Caries.—McClure calls attention to the recent discovery of the inhibitory effect of trace quantities of fluorine in drinking water on dental caries in children and young adults. The addition of fluorine to children's diets during the first seven or eight years of life offers great promise of reducing the prevalence of dental caries. One part per million concentration of fluorine in drinking water is regarded as a permissible level. An estimated quantity of water borne fluorine equal to approximately 0.5 to 1 mg. of fluorine daily present in the average diet from the first to the eighth year of life appears to be instrumental in reducing dental caries to a great degree. This small quantity of additional fluorine ingested during the comparatively few years of formative tooth life presents no health hazard. In certain communities the drinking water may contain fluorine naturally in a quantity equal to 1 part of fluorine per million. In these places a supplement of dietary fluorine would be undesirable. There is under consideration also the advisability of a direct fluorination of drinking water so as to provide an optimum quantity of fluorine for improved dental health. Only in communities in which the water supplies are either fluorine free or contain suboptimal amounts need serious consideration be given to the possible use of a supplement of fluorine in children's diets. Calculations of the quantity of supplemental fluorine required must take into account fluorine present naturally in the local water supply.

American Journal of Medical Sciences, Philadelphia

206:421-560 (Oct.) 1943

Intradermal Test for Susceptibility to and Immunization Against Whooping Cough Using Agglutinogen from Phase I Haemophilus Pertussis. E. W. Flosdorf, Harriet M. Felton, A. Bondi and A. C. McGuinness.—p. 421.
*Thyrotoxicosis as Sole Cause of Heart Failure. W. B. Likoff and S. A. Levine.—p. 425.
Control of Polycythemia Vera by Venesection. L. E. Hines and W. C. Darnall.—p. 434.
Objective Methods to Determine Speed of Blood Flow and Their Results (Fluorescein and Acetylene). K. Lange and L. J. Boyd.—p. 438.
Congenital Heart Block: Study of 2 Cases in Healthy Adults. T. C. Jaleski and E. T. Morrison.—p. 449.
Syphilitic Aneurysm of Celiac Artery. T. C. Laipply.—p. 453.
Localized Agnotogenic (of Unknown Origin) Xanthomatosis of Spleen with Splenomegaly and Anemia. M. L. Dreyfuss and Ella H. Fishberg.—p. 458.
*Clinical Observations on Effect of 3.3'-Methylene-Bis-(4-Hydroxycoumarin). L. R. Wasserman and D. Stats.—p. 466.
Hematoporphyrinuric Neuritis: Report of Case. L. A. Golden.—p. 474.
*Carbon Dioxide by Inhalation as Expectorant. A. L. Banyai and A. V. Cadden.—p. 479.
Mazzini Slide Flocculation Test Sensitivity of Its Antigen. M. Oosting and Virginia Watson.—p. 486.
Further Experience with Furfuryl-Trimethyl-Ammonium Iodide (Furmethide) in Treatment of Urinary Retention Due to Bladder Atony. S. H. Beaser, J. H. Lipton and M. D. Altschule.—p. 490.
Rapid Removal of Excess Joint Fluid by Acid Salts: Experiments with Traumatic Hydrarthrosis of Knee Joint. L. Pelner.—p. 498.
Effect of Ergotamine Tartrate and Neosynephrin HCL on Work Capacity of Human Muscle. G. C. Kotalik, G. L. Maison and C. Pfeiffer.—p. 503.
Cardiac Arrest by Action of Potassium. C. A. Finch and J. F. Marchand.—p. 507.

Thyrotoxicosis as Sole Cause of Heart Failure.—Likoff and Levine analyzed all cases of thyrotoxicosis in which a subtotal thyroidectomy was performed at the Peter Bent Brigham Hospital between 1923 and 1941 inclusive. Among 409 cases there were 78 cases of thyrotoxicosis with some additional form of organic heart disease. In the "noncardiac" group (331 cases) there were 8 with severe and 13 with moderate heart failure (6.3 per cent). These 21 cases offer evidence that thyrotoxicosis alone may cause heart failure even when the blood pressure, the coronary arteries and the valves are normal. None of these patients showed evidence of organic heart disease after an average period of five years (the longest was ten years). There were 4 deaths during this period, all from carcinoma. All the other patients were essentially well. The congestive failure was more likely to occur in the female sex, with increasing age, when the thyrotoxic state lasted longer, and when auricular fibrillation was present. No satisfactory explanation was found for the heart failure. It is suggested that vitamin B deficiency may play a contributory part. The similarity between symptoms and physical findings in mitral stenosis and thyrotoxicosis may lead to errors in diagnosis, for even left auricular dilatation is found in the latter condition on x-ray examination. "Masked thyrotoxicosis" is being overlooked as a cause of heart failure, an error which is costly because the condition is curable.

Effect of Dicumarol.—Wasserman and Stats demonstrated in laboratory animals a prolongation of the clotting time and a reduction in prothrombin activity of the blood from administration of dicumarol. Large or repeated toxic doses produced

widespread hemorrhage and in some animals death. The drug administered orally to 71 adult patients in repeated doses produced a definite fall (after a twenty-four to seventy-two hour latent period) in the prothrombin content and a prolongation of the coagulation time of the blood in most instances. There is a great variability in the degree of response to this drug. A definite fixed dosage schedule cannot be made. Because of the variable response and latent period the drug has not always been useful in the therapy of arterial thrombosis or embolism, arteriotomy or major pulmonary embolism. Because of the danger of hemorrhage, the drug has not proved useful during or shortly after operative procedures or for patients with lesions from which bleeding might occur. Transfusions of fresh blood do not arrest the hemorrhagic tendency due to dicumarol. Several instances have been observed in which embolism, thrombosis or progression of existing venous thrombosis have occurred despite a low blood prothrombin induced by dicumarol. Symptomatic improvement in the 10 cases of occlusive peripheral vascular disease was not observed during a three month period while the prothrombin remained depressed as a result of dicumarol administration. It is possible that dicumarol affects blood coagulation not only by lowering the prothrombin content but through other mechanisms. Further trial is required before the effects of this drug in peripheral venous thrombosis and in pulmonary infarction can be determined. Dicumarol should not be administered if the prothrombin index is less than 50 per cent.

Carbon Dioxide by Inhalation as Expectorant.—Banyai and Cadden studied the clinical use of carbon dioxide inhalations in tuberculous patients. A mixture of 10 per cent carbon dioxide and 90 per cent oxygen administered by the closed method through a mask, or by the open method through a glass tube, is well tolerated. The relief obtained is noticed subjectively and objectively: spells of strenuous, exhausting coughing are prevented and thereby rest is secured for the patient and particularly for the lungs; an unproductive cough is transformed into a useful one; directly after inhalation the amount of expectorated sputum is increased and its character changed from a heavy, thick and tenacious type into a thinner, serous and more watery kind; the use of expectorant drugs and narcotics can be reduced. The effectiveness of carbon dioxide is attributable to the facts that (1) it is a powerful respiratory stimulant and it induces increased inspiratory movements of the thorax, which in turn cause a stretching and dilatation of the bronchial tubes; (2) it stimulates the myoelastic structures of the lung and leads to a forceful peristaltic movement of the bronchi; (3) it liquefies mucopurulent inflammatory exudate that stagnates in the bronchial tract. The treatment is indicated whenever there is an accumulation and retention of inflammatory exudate in the bronchial tract and its evacuation —in spite of strenuous cough—is inadequate. The treatment should not be given to patients who have had recent pulmonary hemorrhage, to those with severe emphysema; when extensive pulmonary fibrosis is present without atelectasis, bronchiectasis or mucopurulent retention in the air passages; to patients with acute plastic pleurisy and pleurisy with effusion; to hypertensive patients, and when the cause of cough is outside the lungs.

Archives of Neurology and Psychiatry, Chicago

50:381-498 (Oct.) 1943

Conduction of Cortical Impulses and Motor Management of Convulsive Seizures. P. F. A. Hoefer and J. L. Pool.—p. 381.
Effects of Morphine on Learned Adaptive Responses and Experimental Neuroses in Cats. A. Wikler and J. H. Masserman.—p. 401.
Growth Asymmetry Due to Lesions of Postcentral Cerebral Cortex. W. Penfield and J. S. M. Robertson.—p. 405.
Prognosis of Multiple Sclerosis. H. D. McIntyre and A. P. McIntyre. —p. 431.
Muscular Tension in Psychiatric Patients: Pressure Measurements on Handwriting as Indicator. J. Ruesch and J. E. Finesinger.—p. 439.
Prevention of Hemorrhages in Brain in Experimental Electric Shock. G. Heilbrunn.—p. 450.
Localized Sweating as Part of Localized Convulsive Seizure. P. C. Bucy and K. H. Pribram.—p. 456.
Syndromes of Pontile Tegmentum: Foville's Syndrome; Report of 3 Cases. W. Freeman, H. H. Ammerman and M. Stanley.—p. 462.
The Scuttle Butt Afloat: Study in Group Psychology. A. J. Roos.—p. 472

North Carolina Medical Journal, Winston-Salem

4:421-456 (Oct.) 1943

Primary Atypical Pneumonia, Etiology Unknown. W. R. Berryhill, E. McG. Hedgpeth, W. G. Morgan, R. E. Stone and Ruby A. Smith.—p. 421.
Local Use of Sulfadiazine, Tyrothricin, Penicillin and Radon in Otolaryngology. S. J. Crowe and A. T. Ward.—p. 431.
Some Epidemiologic Aspects of Poliomyelitis, with Report of 15 Cases. L. D. Hagaman.—p. 435.
Method of Intravenous Iodine Medication for Rapid Preparation of Patients with Diffuse Toxic Goiter for Operation. A. G. Brenizer. —p. 439.

Public Health Reports, Washington, D. C.

58:1429-1456 (Sept. 24) 1943

Experimental Chemotherapy of Burns and Shock: IV. Production of Traumatic Shock in Mice. V. Therapy with Mouse Serum and Sodium Salts. S. M. Rosenthal.—p. 1429.
Notes on Pathology of Experimental Trinitrotoluene Poisoning. R. D. Lillie.—p. 1436.

58:1457-1496 (Oct. 1) 1943

Tuberculosis Mortality in United States: 1939-1941. J. Yerushalmy, H. E. Hilleboe and C. E. Palmer.—p. 1457.

Surgery, St. Louis

14:487-644 (Oct.) 1943

Consideration of Present Status of Shock Problem: "Problems on Shocks." A. Blalock.—p. 487.
Effect of Infusions of Bovine Serum Albumin in Experimental Shock. J. E. Dunphy and J. G. Gibson, II.—p. 509.
Venous Pressures in Patients with Varicose Veins. H. S. Mayerson, C. H. Long and E. J. Giles.—p. 519.
Study of Healing of Abdominal Operative Wounds Following Closure of Perforated Ulcers of Stomach and Duodenum. R. H. Meade Jr. —p. 526.
*Sulfathiazole in Chronic Osteomyelitis. J. W. Toumey.—p. 531.
Solitary Eccentric (Cortical) Abscess in Bone. R. C. Brown and R. K. Ghormley.—p. 541.
Fascia Lata Regeneration: Preliminary Report. J. C. Foshee.—p. 554.
Sulfathiazole Toxic Nephrosis and Kidney Decapsulation. C. A. Wattenberg and R. C. Coleman Jr.—p. 570.
Abdominal Puncture as Diagnostic Aid. C. M. Henry and C. F. Vale. —p. 574
Influence of Duodenal Contents on Intragastric Acidity: Experimental Study. A. Kesavalu and F. C. Mann.—p. 578.
Destructive Angiocystic Disease of Pancreas. W. W. Babcock, M. E. Sano and S. B. Gibson.—p. 588.
Association of Carcinoma in Body and Tail of Pancreas with Multiple Venous Thrombi. W. E. Kenney.—p. 600.
Ligation of Superior Mesenteric Vein. E. Schnug.—p. 610.
*Treatment of Acute Empyema by Continuous Tidal Irrigation. E. J. Poth and Mary E. Mathes.—p. 617.
Perforation of Cervical Esophagus with Mediastinitis. K. D. Grace and T. M. Irwin.—p. 631.
Simplified Suture Testing Apparatus. C. Dennis.—p. 640.

Sulfathiazole in Chronic Osteomyelitis.—Toumey reports 13 cases of osteomyelitis in which chemotherapy was employed at the Lahey Clinic. Healing took place promptly in 10 of the 13 cases, while in 2 chemotherapy could not be used because of reaction to the drug. According to the recommended treatment, a course of chemotherapy and bed rest in the hospital is employed for one week before operation; 90 grains (6 Gm.) of sulfathiazole is given in twenty-four hours. The operative procedure consists in saucerization, local application of from 2 to 15 Gm. of sulfathiazole in the wound, according to the size of the wound, primary closure without drainage, all wound levels being dusted with sulfathiazole, and plaster immobilization, including the joint above and below the site of the lesion. Postoperative chemotherapy consists in oral administration of sulfathiazole for a period of at least two weeks. In 7 cases saucerization was done. Five healed promptly and two did not. Both refractory cases showed sensitiveness to sulfathiazole. In 5 other cases saucerization was not done because of actively draining sinuses without gross evidence of bone infection. All these healed promptly with primary closure.

Continuous Tidal Irrigation in Acute Empyema.—According to Poth and Mathes the aim of the treatment of acute empyema is twofold: preservation of life and prevention of the development of a chronic disease. This aim is realized by the proper application of any procedure which will give early, free and efficient drainage to the cavity, prevent paradoxical respiratory movements of the mediastinal structures and allow the lung to reexpand to fill the cavity and obliterate the dead space. The authors present a scheme for tidal drainage. So-called unresolved pneumonia is usually unrecognized empy-

ema. X-ray examinations should be made. The presence of a scoliosis following pneumonia with the concavity toward the affected side is highly suggestive of empyema. The positive diagnosis must rest on the aspiration of pus. At the time of making a diagnostic puncture one should be prepared to remove as much pus as possible. Pus under pressure should not be left in contact with a puncture wound. The combined aspiration of pus and injection of air serve several functions: (1) It relieves pressure, (2) it decreases the surface area bathed by pus and so reduces toxic absorption, (3) it reduces the required frequency of aspiration in the event that thoracotomy is delayed, because the slowly absorbed air compensates for the reaccumulation of pus, (4) it keeps the cavity partly distended and lessens the likelihood of early pocket formation, (5) it permits accurate x-ray visualization of the extent and nature of the cavity and (6) it occasionally results in a cure of the empyema. When the decision has been made that drainage is necessary, when the pus has become thick and fibrinous and when it has not been possible to demonstrate the presence of acid fast organisms, simple tube thoracotomy is done. A location anterior to the posterior axillary line between the fifth and eighth ribs is the site of choice for tube thoracotomy. Fifty-five consecutive cases of postpneumonic empyema were treated during a period of six years. Two year follow-up studies have been obtained in 54 of the cases. There have been no recurrences, and in no instances has a chronic empyema developed. Two deaths occurred in infants aged 9 and 18 months respectively.

Texas State Journal of Medicine, Fort Worth

39:275-322 (Sept.) 1943

Classification of Bone Tumors. G. T. Caldwell.—p. 282.
X-Ray Treatment of Bone Tumors. C. L. Martin.—p. 285.
Diagnosis in Primary Bone Tumors. W. B. Carrell.—p. 289.
Indications for Surgery in Bone Tumors. B. L. Coley.—p. 290.
Management of Cardiac Arrhythmias. A. W. Harris.—p. 293.
Treatment of Osteomyelitis. G. W. N. Eggers and M. D. Knight. —p. 297.
*Leber's Disease: Report of 4 Cases in One Family. C. S. Alexander. —p. 301.
The Doctor and the Postwar World. W. B. Russ.—p. 303.
Suggested Procedures for Control of Typhus Fever. G. W. Cox.—p. 305.

Leber's Disease in Family.—Leber's disease is defined as a hereditary bilateral primary optic atrophy. It is transmitted by heredity, almost entirely by the female, who is usually unaffected, although it may rarely be transmitted by the male directly or indirectly through the daughters. It may be seen in successive generations; it usually skips one or more generations. The disease frequently affects more than one person in a family, and males more frequently than females. Literature records one postmortem microscopic examination of the optic nerve made by Rehsteiner in 1932. This author found atrophy of the ganglion cells and nerve fiber layer of the retina and atrophy of the optic nerve limited to the papillomacular bundle, with other parts of the nerve normal. The medullary sheaths were almost all destroyed. There was an increase in the glia and atrophy of the finer connective tissue partitions of the nerve. Alexander observed 4 cases of Leber's disease in a family of 5 children. The incidence between the sexes was equal. In the 2 girls the onset of the disease was at 5 years of age, whereas usually first symptoms occur at puberty. One patient presented an associated nystagmus; this is unusual in cases of greatly reduced vision. No other record of its concurrence with Leber's disease could be found. In 2 patients the onset of the disease was at about the fifth year and no improvement was noted. The onset of the disease is usually between puberty and 30 years of age. The chief symptom is great diminution in vision with central scotoma. Complete blindness does not occur. Prognosis is poor, but improvement sometimes occurs. Treatment is of no benefit.

Wisconsin Medical Journal, Madison

42:1005-1112 (Oct.) 1943

Pattern. R. M. Kurten.—p. 1025.
Erythroblastosis Fetalis and Its Relationship to Transfusion Reactions and Accidents. T. A. Leonard.—p. 1034.
Management of Toxemia in Last Trimester of Pregnancy. W. S. Bump. —p. 1037.
Heart Disease and Pregnancy. J. Jensen.—p. 1043.
Resuscitation of Newborn Infant. W. C. Keettel.—p. 1047.
Treatment of Burns. A. A. Schaefer.—p. 1052.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Journal of Radiology, London

16:287-322 (Oct.) 1943

*Occupational Disease of Lungs in Boiler Scalers. L. Dunner.—p. 287.
Isodose Surfaces. W. V. Mayneord.—p. 291.
Classification of Laryngeal Cancer from Radiotherapeutic Viewpoint. M. Lederman.—p. 298.
Technic of Radium Treatment of Intrinsic Cancer of Larynx. M. Lederman and W. V. Mayneord.—p. 301.
Radiologic Appearances in Development of Coal Miners' Pneumonoconiosis. E. A. Aslett, T. W. Davies and T. I. Jenkins.—p. 308.
Dose Contour Finder for Symmetrical and Unsymmetrical Radiation Beams. P. H. Flanders.—p. 314.
X-Ray Treatment of Carcinoma of Esophagus. D. W. Smithers. —p. 317.

Occupational Disease in Boiler Scalers.—Pulmonary lesions in boiler scalers are due to the dust inhaled during scaling. A boiler scaler has not only to remove the scale precipitated on the walls of the boiler but also to clean the flue. Every boiler scaler is exposed to the dust of both the flue and the scale. Dunner describes pulmonary lesions of 12 boiler scalers whose ages ranged from 15 to 70 years. The symptoms bear no relation to the time spent in this work. There were scalers who had worked seventeen to forty-five years before they felt compelled to see their doctor for chest trouble. The symptoms are not characteristic; they are like those of chronic bronchitis or emphysema, but it is noteworthy that severe pains in the chest or dyspnea made some scalers give up their work. A small hemoptysis was noted in 2 cases. The sputum should be examined thoroughly for tubercle bacilli at certain intervals, since tuberculosis may complicate every dust disease of the lungs. As regards the roentgenologic aspects, the author differentiates three types. In the first type there is uniform mottling all over the lungs; in the second type there exist aggregates in addition to the mottling; in the third type fibrosis predominates. The author recommends routine clinical and x-ray examinations of boiler scalers at regular intervals. They should be granted the same rights for compensation as other workers exposed to pneumonoconiosis.

Lancet, London

2:373-400 (Sept. 25) 1943

*Limb Compression in Tube Shelter Disaster. E. G. L. Bywaters.—p. 373.
*Local Therapy of War Wounds: II. With Sulfasuxidine. R. J. V. Pulvertaft and D. H. MacKenzie.—p. 379.
Experimental Alloxan Diabetes in Rat. J. S. Dunn and N. G. B. McLetchie.—p. 384.
Tuberculosis at Children's Hospital: Analysis of Cases.—p. 387.

Limb Compression in Shelter Disaster.—Bywaters reports that among 60 injured survivors of a shelter disaster 12 showed signs of muscle damage. One died of other injuries soon after release; 1 developed a high grade uremia but ultimately recovered; the remaining 10 showed every grade of injury from severe muscle damage to skin erythema only, and all recovered. The course was similar to that of the "crush syndrome"—ischemic muscle necrosis following burial beneath débris as the result of aerial bombardment—but less severe, perhaps because of the short time of compression (one and one-half to two and one-half hours). Quantitative estimation of myohemoglobin, creatine and potassium excretion gave a basis for the calculation of the amount of muscle damaged; this was the best guide to the severity of the lesion and ran parallel to the duration of albuminuria and to the local plasma loss as calculated from (*a*) hemoconcentration, (*b*) Crooke and Morris's figures for dye distribution and (*c*) limb swelling. No conclusions can be drawn as to the efficacy of alkali therapy. The fact that 5 patients whose urine was rapidly made alkaline showed no renal failure, whereas 1 patient subject to exactly the same trauma of a similar duration and extent, but without alkalization, subsequently developed uremia is no complete proof of the efficacy of alkali.

Local Succinylsulfathiazole Therapy of War Wounds.—According to Pulvertaft and MacKenzie, succinylsulfathiazole when taken by mouth is to a small extent broken down to sulfathiazole in the intestinal tract. Its use is indicated in

colonic surgery and in abdominal gunshot wounds. Previous workers claimed that succinylsulfathiazole is split by bacteria to yield free sulfathiazole. It therefore seemed possible that external application might provide a continuous potential source of free sulfathiazole, the rate of breakdown being roughly proportional to the severity of the infection. The rate of absorption and degree of breakdown were compared with those of sulfanilamide and sulfathiazole. It was found that the breakdown of succinylsulfathiazole into free sulfathiazole in ordinary solvents—including plasma, cerebrospinal fluid and fluid from wounds—is too small to produce a dangerous blood concentration. The breakdown is increased by rise of temperature. Succinylsulfathiazole applied locally in the form of a 20 per cent hydrous wool fat cream appeared to limit quickly and effectively the gram-positive flora, control suppurations and accelerate healing. No toxic or irritant properties were noted. Absorption was less than 1 mg. per hundred cubic centimeters of blood. The cream was heated to 40 C. and then applied to wounds with a syringe used as a grease gun. The "reservoir" potentialities of succinylsulfathiazole are a unique feature. If the drug is used intraperitoneally, the hydrous wool fat cream should not be used, as it acts as a foreign body. Probably a microcrystalline form would be best. The authors present the results obtained in 8 cases.

Helvet. Physiol. & Pharmacol. Acta, Basel

1:1-112 (No. 1) 1943. **Partial Index**

"Tegmental Reaction" and Its Physiologic Significance. S. Bürgi. —p. 3.
*Night Blindness and Vitamin A. A. Fleisch and J. Posternak.—p. 23.
Relations of Hypothalamus to Respiratory Metabolism. W. Bloch.—p. 53.
Central Mechanism of Respiratory Reflexes of Vagal Origin: I. Localization of Inspiratory Center. O. A. M. Wyss and M. Croisier. —p. 89.
Relation Between Organ Metabolism and Age of Rats. W. Schuler. —p. 105.

Night Blindness and Vitamin A.—Fleisch and Posternak studied visual adaptation to obscurity with the adaptometer of Engelking and Hartung in 89 Lausanne school children aged between 9 and 12 years. The investigations were made during the early part of 1942 at a time when, because of rationing, the vitamin A content of the diet was probably inferior to that prevalent before the war. At the first examination the threshold of perception was higher than at subsequent examinations, which must be attributed to the fact that the children were not familiar with the apparatus. The second, third and fourth measurements furnished mean constants. Previous to the fourth examination half of the children received, in addition to the vitamins contained in their diet, 159,000 international units of vitamin A divided over fifteen days. Such a dose of vitamin A will cure night blindness due to vitamin A deficiency. This large dose of vitamin A did not modify the visual adaptation of the children. Those who received the vitamin A supplement had an average adaptation curve which was identical with that of those who had not received vitamin A. The authors conclude that during the months from February to May 1942 Lausanne school children had no night blindness and no vitamin A deficiency. This favorable result differs greatly from observations made in other countries, where high percentages of night blindness were detected.

Prensa Médica Argentina, Buenos Aires

30:1313-1356 (July 21) 1943. **Partial Index**

Globular Volume, Globular Concentration and Hemoglobin in Children. D. Fuks.—p. 1313.
Rectosigmoidal Cancer: Colectomy. R. Finochietto.—p. 1337.
*Peptic Ulcer of Esophagus. C. Bonorino Udaondo, V. D'Alotto and J. Nasio.—p. 1342.

Peptic Ulcer of Esophagus.—According to Bonorino Udaondo and his collaborators peptic ulcer of the esophagus is rare. Many cases reported in the literature are cases of ulcerous esophagitis erroneously diagnosed. The clinical symptoms and endoscopic findings of the two diseases are similar. Sternal and xiphoid pain which radiates to the interscapular region is the most frequent symptom of peptic esophageal ulcer. The pain can be elicited by pressure on the lower pole of the spleen. It appears either immediately after swallowing of solid food or with the late rhythm of pain of a gastric ulcer. Dysphagia develops in some cases and is of diagnostic value. In rare cases it is of a paroxysmal type. Regurgitation of food particles streaked with blood and blood in the feces are frequently encountered. Acute hemorrhages from the mouth indicate a grave prognosis. Clinical diagnosis is confirmed by roentgenography and by endoscopy. The esophageal peptic ulcer is easily demonstrated when it is located on the anterior aspect of the lower third of the esophagus. The ulcer is made manifest in the roentgenogram as loss of tissue or as a niche. The ulcer can be visualized by endoscopy. It is covered by an exudate, does not infiltrate its base and does not narrow the lumen of the esophagus. Perforation and hemorrhage are frequent complications. The author reports a case of esophageal ulcer with a biopsy which revealed metaplastic tissue with cells of the gastric fundus. Similar cases have been reported in the literature. They point to the pathogenic role of aberrant gastric mucosa in the various segments of the esophagus.

Revista de la Asoc. Méd. Argentina, Buenos Aires

57:281-342 (June 15) 1943. **Partial Index**

*Changes of Electrocardiogram of Allergic Origin. M. Pantolini.—p. 286.
Asthma and Pregnancy. J. J. Crottogini and A. Giampietro.—p. 293.

Electrocardiogram of Allergic Origin.—Pantolini studied electrocardiograms of 3 adult patients during an allergic shock caused by ingestion of food to which they had been allergic for many years. The patients suffered in childhood either from asthma or from migraine. The electrocardiogram of 1 patient showed sinus tachycardia in the course of which a sinus block with a complete stop of heart action for one instant occurred. Bradycardia (50 to 60 per minute) and a change of the PR interval (eighteen hundredths of a second) were observed in the second patient. The electrocardiogram of this patient showed, when the allergic shock was over, a heart frequency of 80 beats per minute and a PR interval of fourteen hundredths of a second. The electrocardiogram of the third patient showed paroxysmal tachycardia which disappeared after subsidence of the shock. Allergic substances stimulate either or both the sympathetic and the vagal system. Recurrence of attacks was prevented by elimination of the allergic food.

57:471-522 (July 30) 1943. **Partial Index**

*Ayerza's Disease: Modern Conception. M. R. Castex and E. L. Capdehourat.—p. 474.
Metastasic Abscess of Prostate with Staphylococci. R. Ercole and C. E. Echesortu.—p. 503.

Ayerza's Disease.—According to Castex and Capdehourat, Ayerza's disease presents three stages: of chronic bronchitis, of bronchopulmonary and of cardiac involvement. Chronic bronchitis is caused by a toxic infection, trauma of the bronchial mucosa from inhalation of gases, dusts and chemical substances, unfavorable climatic and temperature changes, alcoholism and any disease which lowers the resistance of the bronchial mucosa. The disease begins in youth or in early adult life. It may be present with or without dilatation of the bronchial tree and peribronchial sclerosis. The general involvement of the alveolar bronchioles is manifested in bronchograms as a "tree in winter" without any foliage due to lack of filling of the alveolar bronchioles with the contrast mass. The disease progresses to the second and third stages in persons organically predisposed. Sclerosis of the pulmonary artery and chronic pulmonary emphysema with some degree of rigidity of the thorax develop during the second stage. Insufficient oxygenation of the blood in the pulmonary alveoli leads to general hypoxemia and to hypercapnia. Acute (black) cyanosis in this period is due mainly to hypoxemia, which is also the cause of dyspnea, polyglobulia and increased hemoglobin in the blood. Chronic hypercapnia is the cause of the diminished stimulation of the center of respiration, torpor, somnolence, dilatation and paralysis of the peripheral capillaries and increased alkali reserve. The hemodynamic disturbances and clinical symptoms of the second stage are associated with signs and symptoms which show progressive dilatation and hypertrophy of the right side of the heart. Myocardial insufficiency, predominantly of the right chamber, develops in the third stage, during which the cyanosis is excessive. The therapy during

the first stage is directed toward the chronic bronchitis. Inhalations of a spray of sulfanilamide solution are of value. Inhalations and subcutaneous injection of a mixture of oxygen and carbon dioxide and respiratory gymnastics are of value in the second stage. The therapy of the third, the cardiac, stage of the disease is directed toward alleviation of cardiac insufficiency.

Revista Médica de Chile, Santiago

71:615-712 (July) 1943. **Partial Index**

*Acute Coronary Occlusion. F. Rojas Villegas and E. Lagos Pinto. —p. 615.
*Bromosulphalein Test in Clinical Practice. H. Alessandri, H. Ducci and E. Moya.—p. 625.
Treatment of Prostatic Carcinoma by Bilateral Extracapsular Orchiectomy and Administration of Diethylstilbestrol Dipropionate. E. Ibarra Loring and A. Marchant.—p. 639.

Coronary Occlusion.—Rojas Villegas and Lagos Pinto analyzed the data on 50 patients presenting clinical and electrocardiographic features of acute coronary occlusion. The condition was most common in the fourth decade of life and was predominant in males. The incidence was higher among persons exposed to constant intellectual and emotional stress. Heredity and tobacco seem to play a significant part as etiologic factors. Precordial pain with characteristic irradiation was the most frequent symptom. The occurrence of severe shock in the acute coronary occlusion was regularly associated with a poor prognosis, being present in all patients who died. Age was also an important factor in determining the ultimate outcome, all deaths occurring in patients over 50 years of age.

Bromsulphalein Test.—For the evaluation of liver function in normal and pathologic conditions, Alessandri and his collaborators compared the bromsulphalein test with the cephalin cholesterol flocculation and the sodium benzoate test. In 10 normal persons thirty minutes after the intravenous injection of 5 mg. of bromsulphalein per kilogram of body weight, values lower than 10 per cent of the dye were detected in the serum. Retention above 10 per cent should be considered as due to abnormal liver function. Twenty-five patients with clinical diagnosis of cirrhosis of the liver were studied. In 22 serum bilirubin was higher than normal. Twenty-four exhibited an abnormal degree of bromsulphalein retention. Cephalin cholesterol flocculation was positive in 19. The sodium benzoate test was abnormal in 15. The Takata-Ara reaction was positive in 17. In 3 patients with liver damage as evidenced by hepatomegaly, hyperbilinemia and positive cephalin cholesterol flocculation, the bromsulphalein test gave normal values. In all cases of cardiac insufficiency there was pathologic retention of bromsulphalein. The test was normal in localized pathologic conditions such as liver carcinoma and liver abscess and in cases of lead, manganese and arsenic intoxication. The combined use of the tests studied should offer in clinical practice the best evaluation of the degree of liver damage.

Revista Médica de Rosario, Rosario

33:491-596 (June) 1943. **Partial Index**

Lymphomatosis. J. P. Picena.—p. 528.
*I Agglutinin. M. Balaguer.—p. 564.

I Agglutinin.—Balaguer has performed, in the course of the last three years, more than three thousand blood transfusions. He observed the phenomenon of autoagglutination in 4 cases. The blood of the first 2 patients agglutinated that of 18 donors of all blood groups including blood of universal donors. It disappeared from the blood serum in twenty-four hours. Two patients had acute and chronic insufficiency of the liver respectively. Sedimentation rate of red cells was greatly increased. Autoagglutination was intense. The blood agglutinated without control blood serum, with control blood serum of the group 2 and still more intensely with control blood serum of the group 3. The centrifugated serum agglutinated the erythrocytes of all group types including that of universal donors. Agglutination increased in the blood preparations which were kept on ambient temperature and still more in those which were kept in the ice box for fifteen minutes at a temperature of 2 C. It diminished in blood smears heated to a temperature of 37 C. or kept in an incubator at a temperature of 37 C. The blood serum of these patients agglutinated the erythrocytes of the blood of the groups A and AB in a dilution of 1 to 256 and those of the groups O and B in dilutions of 1 to 128 and 1 to 16. Simonin's test of saturation of the agglutinins in 1 cc. of blood serum with repeated centrifugation of the serum after successive agglutinations from addition of one drop of the serum gave the following results: Agglutination stopped after five drops of the serum were added to blood of the group B, seven drops of the serum to blood of the group O, ten drops to blood of the group AB and eleven drops to blood of the group A. The authors believe that normal blood contains I agglutinogen but not I agglutinin which is the cause of autoagglutinations. In cases of either chronic or acute liver insufficiency the structure eliminates I agglutinins. The latter are destroyed within twenty-four hours in preserved blood serum. The effects of I agglutinins are selective for the various types of erythrocytes. Agglutination increases in a cold temperature and diminishes with a temperature of about 37 C. The presence of I agglutinins in the blood is a constant symptom of liver insufficiency, especially in advanced and severe cases. Transfusion is therefore contraindicated in the advanced stages of liver insufficiency. Serologic tests should be performed in benign cases of liver insufficiency before transfusion is given, to determine whether or not I agglutinins are present.

Archiv für Kinderheilkunde, Stuttgart

125:113-160 (March 24) 1942. **Partial Index**

Problem of Acute Coronary Circulatory Disturbance During Infancy. P. von Kiss.—p. 124.
*Keratomalacia and Vitamin A Content of Food of Infants. H. Goll. —p. 144.
Demonstration of Meningococci in Skin. G. Bonell.—p. 153.

Keratomalacia and Vitamin A Content of Food of Infants.—Goll reports a case of keratomalacia. The infant, aged 10 weeks, had been fed milk from the family cow. The vitamin A content of the milk of this cow was suspected to be low, because she had received no green feed for months (end of April). Examination of the milk revealed that the vitamin A content was at the lower limit of normality. Thus, although the child had received comparatively small amounts of vitamin A it received not less than many other nurslings who do not develop keratomalacia. That the ocular lesion was keratomalacia was definitely proved by the clinical aspects, by epithelial smears from the cornea and conjunctiva, by the vitamin A deficiency of blood and urine and by the prompt response of the lesion to the administration of a vitamin A preparation. The author cites various possible factors which might explain why, on practically identical diets, some infants develop keratomalacia and others do not. The author believes that there are individual differences in vitamin A requirements and in the susceptibility to lesions brought on by deficient diets. A local predisposition of the eye might play a part.

125:161-208 (April 24) 1942. **Partial Index**

Modern Treatment of Gonorrheal Vulvovaginitis in Children. H. Löhe. —p. 161.
*The 1937 Poliomyelitis Epidemic in Zurich with Particular Consideration of Early Symptoms and Treatment. W. Abegg.—p. 166.
Familial Occurrence of Congenital Myxedema. R. Pfaffenbichler. —p. 185.
Significance of Vomiting in Diphtheria. A. Beer.—p. 189.
Cardiac Conduction Disturbances in Scarlet Fever. A. Beer.—p. 194.

Epidemic of Poliomyelitis in Zurich.—Abegg reports observations on 167 cases of poliomyelitis observed in the course of the 1937 epidemic in Zurich, Switzerland. The treatment consisted chiefly in the administration of serum and of blood transfusions. The serum consisted of a mixture of convalescent and so-called contact serum. The efficacy was not entirely convincing. Of the 167 patients, 62.3 per cent recovered, 19.2 per cent were improved, 8.9 per cent were not improved and 9.58 per cent died. Of the 16 patients who died, 7 were moribund at the time of hospitalization. Follow-up revealed that in 10.8 per cent of the patients the paralysis was so severe that they will be severely handicapped for life. No other defects remained besides the paralysis. The severe meningitic symptoms produced neither impairment of intelligence nor signs of parkinsonism. The character changes suggested by the parents of some of the children were more the result of relaxation in discipline, due to pity, than to organic changes.

Der deutsche Militärarzt, Berlin

7:541-604 (Sept.) 1942. **Partial Index**

*Experiences with Atabrine and Calcium in Treatment of Typhus. P. van Meerendonk.—p. 541.
Muscular Symptoms Following Trichinosis and Suitability for Military Service. G. B. Gruber.—p. 542.
Suggestion Regarding Therapy of Serum Disease. E. Leitritz.—p. 548.
Acetylsulfanilamide in Treatment of Trachoma. K. Oberhoff.—p. 548.
Spirillosis of Oral Cavity. H. A. Gins.—p. 553.
Difficulties and Changes in Treatment of Infected Gun Shot Fractures. W. Rückert.—p. 560.
Indications for Amputation on Battle Field. H. Hellner.—p. 570.
Improvised Apparatus for Drip Infusion at Main Dressing Station. P. Brandenburger.—p. 576.
Necessity of Early Care for Injuries of Nose and Sinuses. J. Berendes. —p. 579.

Atabrine and Calcium in Typhus.—Although atabrine treatment of typhus as described by van Meerendonk in an earlier report had reduced the mortality of patients between 30 and 45 years of age by about one third, observations in 225 cases revealed that it had not given the favorable effects that had been expected from it. He believed that a severe impairment of the vascular and capillary system was responsible for the hemorrhagic exanthem as well as for the encephalitis. The more intensive yellow coloration of the skin of typhus patients treated with atabrine, as compared with that of malaria patients given the same treatment, is a further indication of vascular and capillary impairment. Van Meerendonk assumed that calcium deficiency existed in the blood of typhus patients and therefore decided on an intensive calcium therapy. The severest cases in the age group between 20 and 40 years responded to calcium therapy with prompt defervescence; the mortality was zero. Severe cerebral symptoms and impairment of hearing ceased to occur; the rash disappeared earlier and did not become hemorrhagic; yellow staining was reduced. Estimation of the calcium content of the blood of typhus patients revealed values as low as 6 mg. per hundred cubic centimeters. Patients treated with calcium did not exhibit the abnormally low blood pressures. The incidence of bronchopneumonia diminished. The combined atabrine and calcium therapy was employed in the following manner: The patient was given a 0.1 Gm. tablet of atabrine three times daily and from 10 to 20 cc. of a 20 per cent solution of calcium gluconate, or, if this was not available, the same amount of a 10 per cent solution of calcium chloride. In severe cases, up to 40 cc. of these solutions were given daily. Atabrine can be discontinued at the end of seven days or at the time of defervescence, if this occurs sooner. Calcium therapy should be continued for some days after the cessation of fever. The author reaches the conclusion that atabrine acts on the causal organism of typhus, while calcium influences the organic changes.

Münchener medizinische Wochenschrift, Munich

89:391-414 (May 1) 1942. **Partial Index**

*Experiences of Specialists in War and Peace Time with Injuries of Facial Portion of Skull. F. Specht.—p. 391.
Diagnosis of Typhus by Microscopic Examination of Roseola. A. Dietrich.—p. 395.
Archlike Decline of RS-T Interval. H. Ritter.—p. 395.
Vitamin A Storage in Infants. H. Goll and L. Fuchs.—p. 397.
General Practitioner and Synthetic Vitamins. E. Traxel.—p. 400.

Injuries of Facial Portion of Skull.—Specht emphasizes that the facial portion of the skull encloses a complex cavity which is of considerable functional importance. The rhinologists should make the diagnosis and decide on the treatment. Intracranial complications and septic conditions may result from nasal infection in normal circumstances and even more frequently after injuries. Early prevention of adhesions and of obstruction of the accessory cavities is of the greatest importance. Recovery in severe cases of osteomyelitis originating from accessory cavities may be obtained by radical surgical intervention. Immediate correction is more simple and less dangerous. Internal healing may be obtained only by rhinologic methods. Involvement of adjacent or of more distant organs should be kept in mind. Basal skull fractures with ear involvement are frequent. There are also less common paths of infection such as the subperiosteal abscess of the temporal bone or of the zygomatic arch resulting from suppuration of the middle ear. Whether or not the injured will get the correct treatment depends on competent organization, which, however, need not be of vital importance provided the physician who is first called to attend the injured will consult with all the specialists concerned as soon as possible.

Wiener klinische Wochenschrift, Vienna

55:41-60 (Jan. 16) 1942. **Partial Index**

Indication for Surgical Treatment of Chronic Constipation: Permanent Results. H. Finsterer.—p. 42.
*Therapeutic Effect of Injections of Diiodotyrosine Preparations. H. Pieber and H. Seyfried.—p. 46.
Importance of Rapidity of Sedimentation of Blood Corpuscles in Tuberculosis. H. Poindecker.—p. 49.
Intravenous Nonspecific Immune Therapy of Rheumatic Diseases. R. Hoschek.—p. 51.

Diiodotyrosine Preparations for Hyperthyroidism.—Pieber and Seyfried report their experiences with intramuscular and intravenous injections of diiodotyrosine preparations in 20 cases of hyperthyroidism. Mild cases, particularly in the young, reacted exceedingly well. Peroral diiodotyrosine therapy has been tried with satisfactory results. One should not miss the optimum time at which to perform the operation in the more severe cases of hyperthyroidism. Conservative treatment with diiodotyrosine preparations gives satisfactory results, so that surgical intervention may be omitted in a considerable portion of the cases. Diiodotyrosine therapy is an excellent preparatory treatment to surgical intervention. It has the advantage over Plummer's iodine therapy in that it may be stopped at any point. No untoward reactions will occur if the surgical intervention is postponed for some reason. Satisfactory results may be expected from the injections of diiodotyrosine in cases in which the Plummer treatment was ineffective or in which symptoms were caused by the delay of the surgical intervention. Good subjective results were obtained in climacteric hyperthyroidism and in cases associated with severe hypertension and generalized arteriosclerosis. Twenty to 100 mg. of the substance injected daily for from two to four weeks will produce no subjective reactions.

55:121-140 (Feb. 13) 1942. **Partial Index**

Cutaneous Phenomena in Chronic Leukosis and Lymphogranulomatosis (Paltauf-Sternberg). H. Fuhs.—p. 121.
Therapy of Sterility. A. I. Amreich.—p. 125.
*Testosterone Therapy of Peripheral Circulatory Disturbances. W. Ernst. —p. 131.

Testosterone Therapy of Peripheral Circulatory Disturbances.—Ernst treated 29 patients with peripheral circulatory disturbances with testosterone propionate. The patients were from 40 to 70 years of age, 55 years on an average. The peripheral circulatory disturbances were organic in 15 cases and functional in 14. The clinical picture of intermittent claudication was present in 9 cases and that of angina pectoris in 11. Hypertension, hypotension, hyperthyroidism, anemia and hypertrophy of the prostate were associated conditions. Intramuscular injections of 10 mg. of testosterone were made every second or third day for one or two weeks, followed by injections of 5 mg. at the same intervals. In cases of severe intermittent claudication or with threatened gangrene a single initial dose of 25 mg. was injected and the dose was later reduced to 10 and 5 mg. Injections of 5 mg. were continued twice or three times weekly for three to four weeks after improvement had been obtained. The average amount of testosterone propionate administered varied from 45 to 155 mg., being 76.4 mg. on an average. There were no toxic reactions. Bluish discoloration or extreme pallor of the skin disappeared and the color of the skin was restored to normal. Trophic ulcers healed. Subnormal local skin temperature returned to normal. Heart action improved. The typical sudden pains became less severe and less frequent and finally disappeared. The turgor of the skin became firm. There was a strong subjective sensation of heat in the extremities. Tinnitus aurium and vertigo disappeared. Treatment of peripheral circulatory disturbances with testosterone propionate is recommended particularly in cases in which the improvement of the physical and psychic state is of equal importance to that of the circulatory disturbances.

Book Notices

Advances in Pediatrics. Volume I. Edited by Adolph G. De Sanctis, M.D., New York Post-Graduate Medical School and Hospital, Columbia University, New York. Cloth. Price, $4.50. Pp. 306, with illustrations. New York: Interscience Publishers, Inc., 1942.

This is the first of a series of volumes offered as reviews of specialties in medicine. The present volume includes articles on toxoplasmosis by Albert B. Sabin, virus diseases by H. L. Hodes, chemotherapy by B. W. Carey, electroencephalography by N. Q. Brill, the role of vitamin K in hemorrhage in the newborn period by H. G. Poncher, persistent ductus arteriosus and its surgical treatment by Robert E. Gross, the premature infant by Abraham Tow, tuberculosis by W. E. Nelson, endocrinology by M. B. Gordon and a final chapter dealing with a variety of subjects by the editor of the volume, A. G. De Sanctis and G. E. Pittinos. Each of the sections is accompanied by a bibliography of references to recent periodical literature. The authors are men of recognized competence in the fields that they discuss. For the pediatrician who wishes to be abreast of problems of current interest the book may be well recommended.

The Pharmacopeia and the Physician: A Series of Articles on the Use in Therapy of Pharmacopeial Substances Which Appeared in The Journal of the American Medical Association. Second Series. Fabrikoid. Price, $1.50. Pp. 360. Chicago: American Medical Association, 1943.

The articles included in this book have been published from time to time in THE JOURNAL. A previous series was published in the period 1936 through 1938. The popularity of that series of articles led to the production of the present volume, which is made available in handy form on thin paper. The articles are among the most practical of all the available contributions in therapy. Such chapters as those by Marvin on the therapy of dropsy, by Brennemann on pediatric emergencies and by Stillians on the therapy of pruritus are, for example, immediately useful to every general practitioner in his work. The article on epilepsy discusses the possibilities of control by a wide variety of recently developed drugs and technics. Similarly the Rackemann contribution on asthma will be immediately helpful to the physician who must see to it that patients with this chronic disturbing condition are kept comfortable. The demand for this work has been so great that it is being widely circulated by the cooperation of the Board of Trustees of the U. S. Pharmacopeia. A translation is also being made available in Spanish.

Banting as an Artist. By A. Y. Jackson. With a memoir by Frederick W. W. Hipwell. Paper. Price, $1. Pp. 37, with illustrations. Boston: Bruce Humphries, Inc.; Toronto: Ryerson Press, 1943.

In preparation for this booklet an attempt was made to discover every piece of Sir Frederick Banting's art work in Canada, the United States, Great Britain and elsewhere and to make a reference to it. Following a brief sketch of the life of Banting, the author presents a critical note on his work as an artist. Banting was especially devoted to the scenery of Canada, but his sketch book accompanied him throughout the world. The book includes a catalogue of his paintings with the area where the painting was made and the name of the present owner. There are also lists of his drawings and wood carvings. Many of the paintings are owned by physicians, but the vast majority are still in the possession of Lady Banting.

Unit Medical Records in Hospital and Clinic. By Dorothy L. Kurtz. Cloth. Price, $2. Pp. 110, with 8 illustrations. New York: Columbia University Press, 1943.

In recent years the competent medical record librarian has become a professional of no mean attainments. Credit for the development rests principally on the leaders in the field themselves. Creditable publications consequently have come with ever increasing frequency from the record librarians. This book falls in that group. It does not pretend to present information on all aspects of the work of the medical record librarian but it does give much valuable information on the purposes and proper management of the so-called unit medical record—the patient's record both in the hospital and in the outpatient department. It will contribute materially to the work of medical record librarians and consequently to the medical profession.

O lechebnom deystvii antiretikulyarnoy tsitotoksicheskoy syvorotki "ATsS." Sbornik tezisov dokladov, zaslushannykh na konferentsii 12-14 iyulya 1942 goda pod redaktsiey i so vstupitelnoy statey akad. A. A. Bogomoltsa. [On the Therapeutic Action of the Antireticular Cytotoxic Serum "ACS." Abstracts of Reports Delivered at the Conference on the 12th-14th of July, 1942, with an introductory article by the editor, A. A. Bogomolets.] Cloth. Pp. 168. Ufa: Izdanie Akademii Nauk USSR, 1942.

This small volume contains reports on the therapeutic effect of the antireticular cytotoxic serum. The new therapeutic agent, the result of years of research by Prof. A. A. Bogomolets, is based on the conception that the connective tissue of an organism contains a number of hitherto uninvestigated physiologic functions. The aim of the antireticular cytotoxic serum is to stimulate these functions and to intensify active immunity.

The serum is produced by the immunization of horses with the cells of the spleen and bone marrow taken from a human corpse. The determination of the amount of cytotoxins in the serum obtained is important. It was found that the amount of cytotoxins in the serum of the immunized animal can be determined by applying a modification of the reaction of complement fixation (the reaction of Bordet-Gengou), that is, by using an antigen for the reaction of complement fixation, the same antigen as is used for the immunization of the animal. To determine the strength of the serum it is necessary to find out in what dilutions it still gives a complete fixation of the complement. Therapeutic serums are those which give a complement fixation in a dilution of not less than 1:100. The serum is injected subcutaneously in an isotonic solution in the dilution of 1:10. The stimulating dose of the diluted serum equals 0.3-1.0 cm. Small doses of cytotoxic serum have a stimulating effect, whereas large doses have an inhibitory effect. The reactivity of the physiologic system of connective tissue can be determined by a number of tests, such as (1) the dermal test with trypan blue, (2) blood morphology, (3) the sedimentation speed of erythrocytes, (4) the titer of the complement, (5) the opsonic index and (6) the phagocytic activity of the leukocytes. On the basis of more than 2,500 clinical cases presented at the conference, a favorable effect was established in cases of war trauma and in (1) the delayed healing of fractures, sluggish and infected wounds, generalized purulent infection, frostbites and burns of the second and third degree and infected injuries of the eye, (2) a number of infectious diseases such as spotted typhus, puerperal and gynecologic sepsis, rheumatism, unresolved pneumonia and abscess of the lung, (3) traumatic and infectious diseases of the central and peripheral nervous system and a number of psychoses, and (4) diseases due to trophic disturbances of the tissue, such as ulcer of the stomach, ozena and eczema. Of the 1,500 cases of various wounds and injuries in which one would expect the most striking effect of the serum, only 60 per cent gave "positive results," while 40 per cent gave "negative results." With the exception of the report on ozena, most of the results rather deal in generalities. The theoretical basis for this new therapy appears to be well thought out and to contain an intriguing biologic concept. The clinical results are not altogether convincing. All that can be said for the present is that the work is interesting and original. The volume is in Russian with abstracts in English.

What the Citizen Should Know About Wartime Medicine. By Joseph R. Darnall, M.D., Lieutenant Colonel, Medical Corps, United States Army, and V. I. Cooper. Cloth. Price, $2.50. Pp. 237, with 11 illustrations by André Jandot. New York: W. W. Norton & Company, Inc., 1942.

The present world war placed on the medical profession a burden beyond any that has ever before been its responsibility. Few people really understand the immensity and the complexity of the task of the Army Medical Department. Hence the book of Lieut. Col. J. R. Darnall is especially valuable in explaining the machinery for the examination of selectees, the organization and function of the medical departments of both the Army and the Navy and the work of these departments in the theater of military operations, in the home area and in the combat zone. Especially interesting is the chapter entitled "Medicine Takes to the Air," dealing with phases of medical care during war that did not exist in previous wars. Most useful to the average reader are the sections on communicable diseases and other infectious diseases which are especially a military problem. The book is supplemented by a well chosen bibliography.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

THYROIDECTOMY FOR ADOLESCENT HYPERTHYROIDISM

To the Editor:—I have heard an authority on thyroid disease state that the thyroid gland should never be removed from a girl between 12 and 16 years of age for hyperthyroidism. Is this the general consensus?

M.D., Iowa.

ANSWER.—Two main arguments form the basis of the opinion expressed by a few authorities that thyroidectomy is an undesirable procedure for the treatment of adolescent hyperthyroidism: 1. Thyroidectomy would lead to postoperative myxedema and pseudocretinism in an age period of physical growth and mental development. 2. Hyperthyroidism at this age would tend toward spontaneous and permanent remission. However, these contentions never have been supported by clinical facts and remain on a purely theoretical basis. Well controlled studies of the subject have shown that, as a rule, postoperative myxedema does not occur in these cases and growth and development of the children on whom thyroidectomy is performed proceeds in an entirely normal manner. In many cases conservative treatment will fail to control the condition, and hyperthyroidism will either persist or recur after a period of time. The delay in surgical intervention in hyperthyroidism of adolescence has led to the development of disturbances in behavior and psyche with the consequent harmful effects during the formative adolescent period. From an extensive review of the literature concerning the pros and cons of thyroidectomy in adolescent hyperthyroidism and from the analysis of their own carefully controlled data, Black and Webster concluded that all children under 18 years of age having hyperthyroidism should be subjected to subtotal thyroidectomy at the earliest moment compatible with adequate preparation. This attitude represents the consensus on the subject. References:

Black, J. B., Jr., and Webster, Bruce: Hyperthyroidism in the Adolescent, *J. Clin. Endocrinol.* **1**: 859 (Nov.) 1941.
Greene, E. I., and Mora, J. M.: Thyroidectomy for Thyrotoxicosis in the Young, *Surg., Gynec. & Obst.* **53**: 375 (Sept.) 1931.
Welti, H.: Surgical Treatment of Toxic Diffuse Goiter of Children, *Mém. Acad. de chir.* **63**: 1229 (Nov. 17) 1937.

PENICILLIUM AND PENICILLIN

To the Editor:—What substance chiefly is used on which to grow the mold from which penicillin is now secured for medicinal purposes? I understand that the mold in Roquefort cheese is related botanically to the mold from which penicillin now is chiefly extracted. Is the Roquefort cheese mold especially rich in penicillin? Is the domestic cheese now being used in dressings for infected open wounds because of the rapid mold growth?

Alexander C. Howe, M.D., Brooklyn.

ANSWER.—Penicillium notatum is grown on various liquid mediums for the purpose of producing penicillin. The common medium is composed of corn steep liquor, containing lactose or dextrose and a number of essential salts. Some strain of Penicillium notatum may be isolated from Roquefort cheese, but not all strains of Penicillium are capable of producing penicillin. The active antibacterial agent is developed by the mold during its growth in liquid medium. It is not present in large quantities in the mold itself. Before the question could be answered more specifically it would be necessary to isolate strains of the mold from cheese and test them for their capacity to produce active penicillin.

BACK SUPPORTS AND TRUSSES NOT INDICATED FOR NORMAL WORKERS

To the Editor:—In the last few months I have had a suggestion that a canvas back support and/or a truss be routinely furnished to all workmen engaged in laborious lifting as a preventive measure against development of inguinal hernia and back strains or sprains. My opinion is against this. I would appreciate your point of view.

S. Robert Thau, M.D., New York.

ANSWER.—Laboring men do not need a canvas back support to prevent back strains or sprains. As a matter of fact, such supports will probably induce muscle atrophy and will not protect against injuries. Such supports also inhibit the workman in performing the normal duties of his occupation, because he does not have the freedom of motion he would have without any support. A truss will not prevent a hernia. Inguinal hernias are congenital in origin and will probably develop in spite of a truss. In this case likewise a truss to prevent hernia would have an inhibitory effect on a man's occupation.

JAUNDICE ASSOCIATED WITH MENSTRUATION

To the Editor:—A white unmarried woman aged 34 has noted jaundice, which, as nearly as can be ascertained, had its onset at about the time of puberty. It first appears about two weeks before menstruation, reaches a peak about two or three days before the period, subsides rather rapidly after its onset, and goes through the same course the next month. It is definitely more severe at one period than at another but is always present, sometimes in slight degree. There are no food idiosyncrasies, and fats and "heavy" vegetables are well tolerated. Stools are never clay colored, and belching and flatus are not a problem. Chronic constipation is relieved by liquid petrolatum. The previous history is noncontributory. The family history reveals diabetes in the maternal grandmother, aunt, uncle and cousin. With some periods there appears a chronic cystic mastitis, the onset of the enlargement of the cysts corresponding rather closely with the onset of the jaundice, and there is some relationship between the severity of the jaundice and the amount of mastitis present. The appetite becomes keen at the midmenstrual period, which corresponds to the onset of the jaundice and lasts for approximately one week. She says she cannot satisfy her appetite at this time. The menstrual periods are irregular, thirty-four to forty days, lasting four to five days and of moderate flow. Cramps and pain are not usual, except that when the periods are late there is a tendency toward distressing cramps. The later the flow, the more severe the jaundice, mastitis and cramps. On physical examination one week before menstruation the patient appears well developed and well nourished but not obese. The scleras present an orange-yellow icterus. The skin, normally rosy, is now sallow. The breasts have multiple palpable tender nodules along the medial and inferior borders bilaterally. The abdomen, liver and spleen are of usual size. All other findings are essentially negative. There were 4,930,000 red cells; hemoglobin was 14.2 Gm. Fragility test gave initial hemolysis of 0.44 per cent and complete hemolysis 0.40 per cent. The urine test for urobilinogen was positive in a dilution of 1 to 10 and 1 to 20, negative at 1 to 30. The icterus index was 15-21. The direct Van den Bergh was negative; indirect, 2.9 mg. per hundred cubic centimeters. No cholecystogram was made. Search of available literature does not reveal any similar cases. Is such a syndrome recognized? Has any work been done on it?

M.D., Wisconsin.

ANSWER.—This is a unique syndrome. Lichtman (Diseases of the Liver, Philadelphia, Lea & Febiger, 1942, p. 643) says that Senator has noticed jaundice repeated with each menstrual period in certain individuals.

The case probably represents some functional disturbance and it deserves further study to determine whether this functional disturbance is in the biliary tract (presumably a transient obstruction due to dyskinesia with spasm of the sphincter of Oddi) or whether it is a functional disturbance of the hepatic parenchyma. For this reason whatever tests are done should be done during the height of the jaundice and should be repeated in the free interval. The contrast between the findings at the two periods would be significant. The tests already done (presumably performed at the height of the jaundice) are inconclusive. They at least make a hemolytic mechanism improbable.

In addition to the tests already mentioned there should be cholecystograms, cholesterol and cholesterol ester determinations in the blood, cephalin flocculation tests (Hangar) and alkaline phosphatase determinations in the blood. Possibly also galactose tolerance tests and benzoic acid (hippuric acid) tests might be of help. It is reported that liver function shows diminution by the benzoic acid test during the first day of menstruation (Heilig, Robert, and Kantiengar, N. L.: *Ann. Int. Med.* **16**:538 [March] 1942).

PERMANENTLY ENLARGED BREASTS FROM PREGNANCY

To the Editor:—A woman aged 30 had an enlargement of her breasts during her first pregnancy. She was unable to nurse the baby, and the breasts remained enlarged. Now during the second pregnancy the breasts enlarge further. Is there any way of stopping their growth?

M.D., New York.

ANSWER.—Apparently the forces which make for the development of mammary tissue include both the estrogenic and progestational hormones of the ovaries and certain of the pituitary secretions. The only known way to reduce these stimuli would therefore be either extirpation or partial destruction of these glands, presumably by surgery or irradiation. Such methods could not be considered in clinical medicine. The alternative is, of course, plastic surgery, which would have to be delayed until after the approaching lactation period has ceased.

INHERITANCE OF LEFT HANDEDNESS

To the Editor:—Which hand will the offspring use when both parents are left handed (the relative percentage)? When there is one right handed and one left handed parent?

M.D., Alabama.

ANSWER.—The causes of right and left handedness are not clearly understood. Some studies suggest hereditary factors operating in some families, but the extent to which they do so is unknown. If both parents are left handed approximately 45 per cent of children are left handed. If only one parent is left handed about 12 per cent of children use the left hand. These statements are not based on large series but probably they are not grossly incorrect.